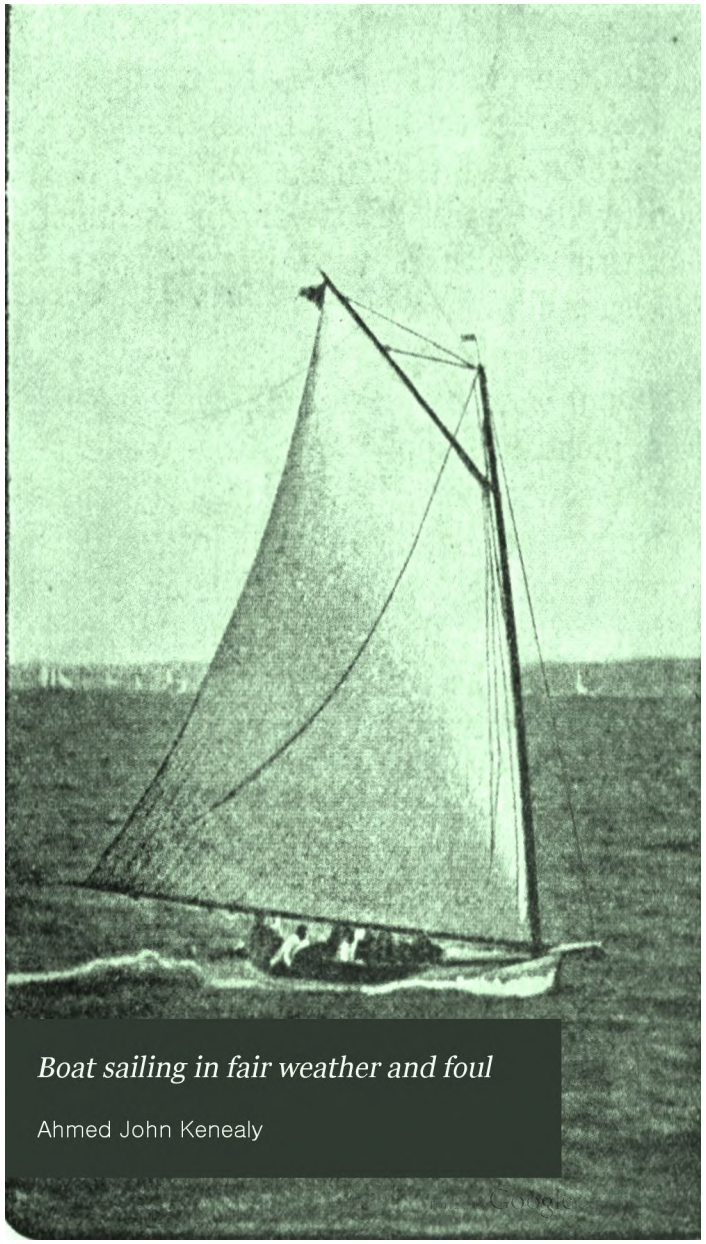

Boat sailing in fair weather and foul

Ahmed John Kenealy

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BOAT SAILING

IN

FAIR WEATHER AND FOUL.

BY

CAPTAIN A. J. KENEALY.

"Man made him a boat of a hollow tree,
And thus became lord of the bounding sea."

1905.
SEVENTH EDITION.
REVISED.

WITH ILLUSTRATIONS AND DIAGRAMS.

THE OUTING PUBLISHING CO.

NEW YORK. LONDON.

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PREFACE.

THE demand for a seventh edition of this book is as gratifying to the author as the numerous letters in its praise have been unexpected. That it has had so large a sale is no doubt due to the great and growing popularity of the sport of boat sailing which for health and recreation is in my judgment unsurpassed by any other out-door pastime. I have carefully revised all the chapters and have made some additions which I hope may be of service to the amateur.

A. J. KENEALY.

New York, February, 1905.

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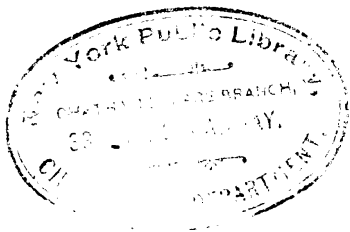

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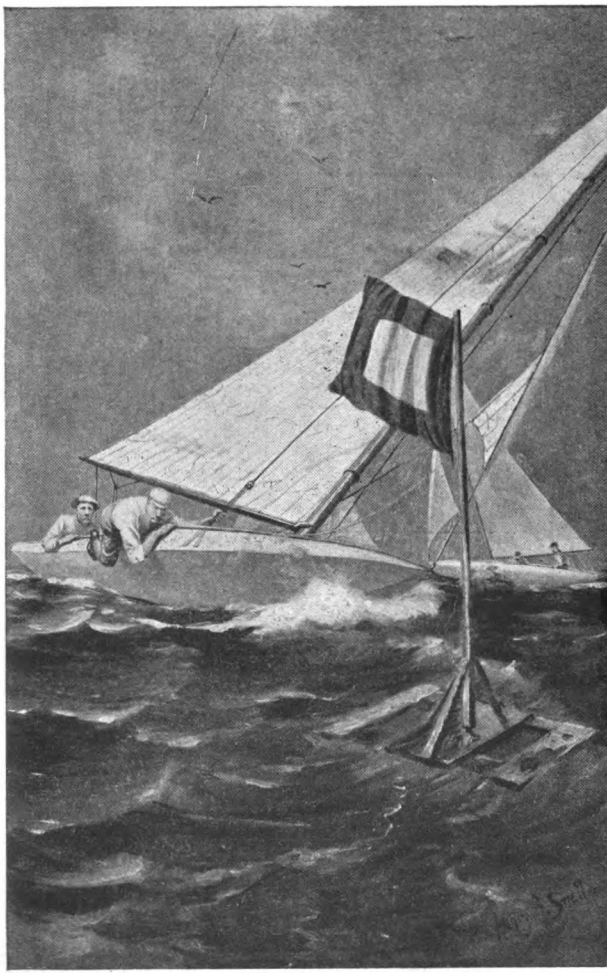

TURNING THE STAKE.

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I.

ADVICE TO AN AMATEUR.

ALL of us remember the old sailor's retort to the man who reproached him for soaking his clay in bad rum. "There ain't such a thing under heaven as *bad* rum," he sagely remarked. "Of course some rum is better than another, but I have been knocking about the world for more than fifty years and never did I drink a glass of rum that deserved to be called *bad*, and I got outside of some pretty fiery tipple in my time."

The same is true in a general way of boats. There are many types of boat and each has some peculiar attribute to recommend it. No two craft, for instance, could be more widely different in every way than a Gloucester fishing dory and a Cape Cod cat-boat, yet each when properly handled has safely ridden out an Atlantic gale. Of course if

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their movements had been directed by farm hands both would have foundered. In point of fact, there is no royal road to the acquisition of seamanship. Experience is what is needed first, last and all the time. It is true, however, that the rough sea over which the learner has necessarily to sail may be smoothed for him, even as the breakers on a harbor bar are rendered passable for a homeward-bound craft by the judicious application of a little oil.

The choice of a boat depends upon a vast variety of circumstances, the chief of which is the location of the prospective boat owner. If he lives on the Great South Bay, for example, he should provide himself with a craft of light draught, almost capable of sailing on a clover field after a heavy fall of dew. Equipped with a centerboard and a sail a boat of this kind, if of the right shape and construction, will be found comfortable, safe and of moderate speed. A man may also enjoy an infinite amount of pleasure aboard her, after he has mastered the secret of her management. There are so many sandbars in the Great South Bay that a boat of light draught is indispensable to successful sailing. The same remark applies also to Barnegat Bay and adjacent New Jersey waters. There are some persons who believe that it is impossible to combine light draught and safety. They make a great mistake. A twelve-foot sneakbox in Barnegat Bay, with the right man steering, will live for a long

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time in rough water that would sorely try the capacity of a much larger craft in the hands of a lubber. The same is true of a sharpie.

The man who makes up his mind that he wants a sailing boat should study well the geography of his vicinity. If he lives in New York or on the Sound his course is easy. He is sure to be within reach of a yacht or boat club from whose members he can get all the information he needs. They will tell him the boat best adapted to his requirements and his finances, and if they persuade him to join their organization they will be conferring upon him a favor. I have traveled a good deal among the yacht clubs of New York, New Jersey and Connecticut, and I never came across a more generous, more obliging and more sportsmanlike body of men than those enrolled on the rosters of these enterprising associations. They are convinced that there is more real pleasure to the square inch in the possession of a stout boat capable of being managed by a couple of men, than there is in the proprietorship of a big yacht that carries a crew of twenty and whose owner probably knows nothing about the art of sailing her, but depends all the time on his skipper. It is a pleasure to meet these men and listen to their yarns. The earnestness, the zeal and the ability with which they pursue their favorite pastime are indeed commendable. And the best of it is they are always ready to welcome recruits, and to pass

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them through the rudimentary mill of seamanship and navigation, their motto being "Every man his own skipper." The only requisite necessary to membership in one or more of these clubs is that you should be a "clubable" man with manly instincts. Young fellows, too, are eagerly sought, so you need have no compunction about seeking their doors, the latchstrings of which are always down.

By all means join a club, I say. You get all the advantages of the house and the anchorage, and all the benefits that accrue to association with men who are ardent and enthusiastic in the enjoyment of their pet diversion. Besides—let me whisper a word in your ear, my brother, you of the slender purse or may be economic instincts—it will be cheaper for you in the end; it will put money in your purse. Your boat will be looked after all the year round by watchful guardians, who will see that it isn't stripped or rifled by river pirates, and that the elements do not mar its beauty. I confess I was surprised when I learned how little it costs to become entitled to all the privileges of these clubs, and it is owing to their moderate charges that the "mosquito fleet" in the vicinity of New York is growing so big and interest in the sport is increasing so rapidly.

What I have written of New York is true, perhaps, in a greater measure of Boston. There is no finer sheet of water for boat sailing than Boston Bay,

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and no people in the world are more devoted to the sport than those who dwell in the city of culture and its sea-washed environs. There are plenty of yacht clubs between Point Allerton, on the south, and Marblehead, on the north. It has been ascertained that more than five thousand members have joined these organizations and that nineteen hundred yachts are enrolled on their lists, most of the craft being less than twenty feet on the water line. It will thus be seen that Boston fully appreciates the value of small sailing craft as a means of amusement and healthful recreation. The port from which *Volunteer*, *Mayflower* and *Puritan* originally hailed, though justly proud of those three magnificent racing yachts, has always been distinguished for turning out stout, able and seaworthy vessels of the smaller type, and also for breeding a sturdy race of men who know every trick of seamanship. The majority of the boats are so constructed and rigged as to ensure that they will render a good account of themselves in a blow and a seaway. Thus the "sandbagger" type of vessel is rarely found "down east," and this, in my opinion, need not be regretted.

The catrigged boat, with stationary ballast and a centerboard, may be said to be the type generally preferred in those waters. The Newport cat-boat is famous the world over for her handiness, speed and ability. I know that it is fashionable for scientific men and swell

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naval architects to decry the seaworthiness of these boats. It has been urged that the weight of the mast in the eyes of the craft is a serious objection, a strain on the hull, and not unlikely to be carried away for want of proper staying. The long boom also has been objected to, because of its liability to trip. The craft has been declared difficult to steer and a regular "yawer." But while saying unkind things of the cat-boat's behavior in a blow, no critic, however biased, has ventured to deny her general handiness.

I might remind these gentlemen that the owner of a pleasure boat does not as a rule sail her in a blow or in a seaway, but this would not be a fair or legitimate argument. The elements are treacherous. A summer storm often plays havoc among the shipping, and a man who ventures seaward in the morning in a balmy breeze and with the water smooth as a horsepond may be caught in a savage blow, followed by a heavy sea, both of which may sorely try the capabilities of his craft and his own resources as a seaman.

I am such a devout believer, however, in a cat-boat of proper form and rig, that I will defend her as a good and handy craft in both fair weather and foul. It blows hard in Narragansett Bay sometimes, and I have often known a devil of a sea to be kicked up off Brenton's Reef lightship. But the Newport cat-boat, with a couple of reefs down, comes out of the harbor and dances over the

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steep waves like a duck or a cork. I never saw one of them come to grief, and in fact they have always impressed me as being the handiest all-round boat afloat. I have sailed in them in all sorts of weather, and I am not likely to alter my opinion. Many of the objections raised against them are idle. For instance, the mast can be so stayed as to be perfectly secure. There is also no reason why the boom should project so far over the stern as to trip, and in this connection I should like to ask of what use is a topping lift unless one avails himself of it in just such an emergency? A man should always keep the boom well topped up when running before the wind in a seaway, and by this means he may avoid much trouble and possibly peril.

The above remarks are applicable to both salt water and fresh water, to the yachts of the North, the South, as well as of the Great and Little Lakes, and indeed wherever the glorious sport flourishes. In point of fact, all the hints and directions given in these chapters may be followed with profit on the Pacific Coast as well as on the Atlantic Seaboard, on Lake Michigan or on the Gulf of St. Lawrence.

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II.

THE CHOICE OF A BOAT.

IF any ambitious would-be mariner, old or young, hailing from anywhere were to ask me what sort of a boat I would recommend him to build or buy, I would answer him frankly that an able cat-boat, with a center-board and stationary ballast would, in my judgment, be best. I would advise him to shun the "sandbaggers"—not that one cannot enjoy an immense amount of exciting sport in one of them, but because they seem to me to be only fit for racing, and I will tell you why. A man when he goes on a quiet cruise doesn't want to be bothered by having to shift heavy bags of sand every time the boat goes about. It is too much like hard work, and by the time your day's fun is finished you feel stiff in the joints. I have other arguments against the use of shifting ballast, but do not think any other save the one mentioned is necessary.

This point disposed of, let us confer. Of what shall the stationary ballast for our able cat-boat consist? Outside lead is of course the best, but its first cost is a serious matter. A cast-iron false keel or shoe answers admirably, and is moderate in price. Some persons object to it, claiming that it rusts and corrodes;

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that its fastenings decay the wooden keel to which it is bolted, and that its weight strains a boat and soon causes her to become leaky. There is of course some truth in these charges; but if the boat is built by a mechanic and not an impostor, none of these disadvantages will exist, and the cast-iron keel will prove to be both efficient and economical.

But if, by straining a point, lead can be afforded, procure it by all means and have it bolted on outside. It neither tarnishes nor corrodes, and as it does not deteriorate, its marketable value is always the same. Racing yachts have, however, been known to sell for less than their lead ballast cost, but such instances are rare. It should be borne in mind that the lower down the lead is placed the less the quantity required, and the greater its efficiency.

There are always a number of second-hand cat-boats in the market for sale at a reasonable rate, and an advertisement will bring plenty of replies. But for a tyro to purchase a boat haphazard is a mistake on general principles. It is like a sailor buying a horse. Get some honest shipwright or boat builder to examine, say, some half-dozen boats whose dimensions suit you, and whose prices are about what you think you can afford. There are certain portions of a cat-boat that are subject to violent strains when the craft is under way. The step of the mast and the center-board trunk are parts that require the vigilant eye of an expert.

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Human nature is prone to temptation, and paint and putty are used quite often to conceal many important defects in a craft advertised for sale. The keen eye of a mechanic who has served his time to a boat-builder will soon detect all deficiencies of this kind, will ferret out rotten timbers, and under his advice and counsel you may succeed in picking up at a bargain some sound, seaworthy and serviceable craft in which you can enjoy yourself to your heart's content.

But if some rotten hull is foisted on you by an unscrupulous person you will be apt to "kick yourself round the block," for she will be always in need of repairs, and in the end, when she is finally condemned, you will find on figuring up the cost that it would have been money in your pocket if you had built a new boat.

The principal boat-builders of New York, New Jersey, Connecticut and Massachusetts are men of high character, who take a pride in their work (which is thoroughly first-class), and whose prices are strictly moderate. Any one of these will construct a capital boat of good model and fair speed. I am an old crank and a bigot in many things appertaining to boats and the sea, but I hope that any reader of this who is going to build a pleasure craft will follow my advice at least in this instance: Let her be copper-fastened above and below the water-line. Don't use a single galvanized nail or bolt in her construction. See that the fastenings are clenched

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on a roove—not simply turned down. Don't spoil the ship for a paltry ha'porth of tar. Many builders, for the sake of economy, use galvanized iron throughout, and will take a solemn affidavit that it is quite as good as copper. But in the innermost cockles of their hearts they know they are wrong. Others more conscientious use copper fastenings below the water-line and galvanized iron above; but copper throughout is my cry, and so will I ever maintain while I am on this side of the Styx.

Sometimes one may pick up a good serviceable boat at a Navy Yard sale. Uncle Sam's boats are of fair design and well built. They are often condemned because they are what is called "nail sick," a defect which can be easily remedied. Occasionally a steamship's life-boat can be bought for a trifle, and if it be fitted with a false keel with an iron shoe on it, will prove thoroughly seaworthy and a moderately good sailer.

Mr. E. F. Knight, the English barrister and author of the "Cruise of the *Falcon*," tells how he bought a life-boat condemned by the Peninsular and Oriental Company. She was thirty feet long with a beam of eight feet, very strong, being built of double skins of teak, and, like all the life-boats used by that company, an excellent sea boat. This craft he timbered and decked, rigged her as a ketch, and crossed the North Sea in her, going as far as Copenhagen and back, and encountering plenty of bad weather during the adventurous voyage. Mr.

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Knight is a believer in the pointed or life-boat stern for a small vessel. He was caught in a northwest gale, in the Gulf of Heligoland, in the above-mentioned craft, and had to sail sixty miles before a high and dangerous sea. His boat showed no tendency to broach to, "but rushed straight ahead across the steep sea in a fashion that gave us confidence and astonished us. Had she had the ordinary yacht's stern to present to those following masses of water, instead of a graceful wedge offering little resistance, we should have had a very uncomfortable time of it. Many men dislike a pointed stern and consider it ugly. However that may be it behaves handsomely, and we should certainly recommend any amateur building a sailing boat for coasting purposes to give her the life-boat stern."

Mr. Knight fitted his boat with lee boards, which no doubt served their purpose admirably. I should, however, favor a false keel and an iron shoe as being more efficient and less unsightly. I should not advise the purchaser of a condemned life-boat to have her fitted with a centerboard. The cost would be high, and unless the job was done in a first-class manner by a man experienced at this sort of work it would be very unsatisfactory.

A "nail-sick," clencher-built boat should be hauled up on the beach and filled with water. Every leak should be marked on the outside with chalk or white paint. After all the leaks have

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been discovered, run the water out of her and dry her thoroughly. Next examine every nail and try the lands or joinings of the planks with the blade of a very thin knife. Any rivets which have worked loose must be taken out and replaced with nails and rooves of a larger size. Through the chief parts of the bottom it may be necessary to put an additional nail between every two originally driven. Many of the old nails which are only a little slack should be hardened at their clench by a few taps from inside, one hand holding a "dollie" against the head of the nail on the outside. Melt a pound of pitch in a gallon of boiling North Carolina tar and give her bottom a good coat inside, filling the lands or ledges well. The garboard strake fastenings and also those of the hooded ends should be carefully caulked. So should the seams. The seams of the planking should also be caulked.

There are various methods of making a boat unsinkable. Cork is sometimes used, but it takes up too much room and is not so buoyant as air. Copper or zinc cases, made to fit under the thwarts and in various odd corners, have been fitted in boats, but their cost is high. Amateurs have used powder flasks and cracker cans, with their covers soldered on, cigar boxes, covered with duck and painted, bladders inflated with air, etc., etc. A boat displacing one ton will take about forty cubic feet of air to make her unsinkable.

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III.

TRIAL SPIN IN A CAT-BOAT.

BEFORE getting a cat-boat under way from an anchorage, or casting adrift from moorings, the captain should see all gear clear, that the centerboard works easily in its trunk, and that oars, rowlocks and a baler are aboard. An oar is very handy for turning a boat's head round in a light air when she has barely steerage way on; and in case you are confronted with a flat calm, a pair of oars are indispensable for working homeward. A boat-hook, too, should not be neglected. There is a story that I heard in the forecastle, of a mean old Dutch skipper who left his new anchor ashore on purely economic grounds. He was afraid it might rust, I suppose. The result of this thrifty dodge was the loss of his vessel on the Goodwin Sands. My counsel to the young boat-skipper is to see that his anchor is snugly stowed away forward, and that his chain—if his cable is of chain—is properly shackled to the ring of the anchor, and that the inner end of the cable is fast to the heel of the mast by a lashing that can be cut if it is necessary to slip at any time. If the cable is of rope,

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take care that it is not made fast to the ring with a slippery hitch. Anchors cost money, and a bend that will not come adrift is quite simple to make.

Cast the tyers off the mainsail and hoist it, pulling up best on the throat halyards and then "swigging" on the peak till the after-leech is taut and the sail begins to wrinkle slightly at the throat. While you are setting the sail, let the sheet fly. Next coil down the throat and peak halyards clear for running, and see that the mainsheet is free from kinks and coiled so that it can be eased off at a moment's notice without any danger of jamming in the block. A kink in the mainsheet has capsized many a cat-boat. Before you reeve a new mainsheet, stretch it well and take all the kinks out of it. Take care that the running parts of all sheets and halyards are coiled uppermost, with the ends underneath.

Let us suppose that there is a nice breeze blowing and that your intention is to essay a four or five mile beat to windward, and then conclude your trial trip with a run home. Cast adrift from your moorings or get your anchor aboard, as the case may be, and start out on whichever tack is convenient. When on the starboard tack the boom is over to port, and *vice versa*. Lower the centerboard and fill away on the boat with one hand on the tiller and the other holding the mainsheet, which should never be belayed, but may be held by half a turn round the cleat.

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Do not make the mistake of trimming in the sheet too flat, but let the boom off till it is well on the quarter and keep the sail well full, not allowing it to shiver. This is called steering "full-and-by," which signifies as close to the wind as possible with the sail not shaking. If your boat is well balanced—that is, if her weights are well adjusted and her sail of proper cut—she will carry quite a little weather helm. So much so that if you allow the rudder to come amidships or on a line with the keel she will fly up in the wind and her sails will shake. This is by no means a fault unless it is carried to excess, and it may be said, indeed, that there is something radically wrong with a craft that requires lee helm—a defect that should be remedied at once.

The young sailor should bear in mind that to accomplish the best results in beating to windward the sail should always be kept full. Nothing is gained by sailing a boat right in the wind's eye with the sail shivering. The boat then points higher but she goes to leeward like a crab. Instances have been known of a fore-and-aft racing yacht sailing within three points of the wind, but these are rare, indeed. The ordinary cat-boat will not often do better than pointing up within four points of the breeze, and her best windward work is generally thus accomplished. There are occasions, indeed, when what is known as a "fisherman's luff" may be indulged in with profit, such as when

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rounding a mark or shooting up to an anchorage where there is little room. The maneuver consists in luffing the boat up into the wind so that the sails shake, and she shoots dead to windward by her own momentum. If the boat is a heavy one she will shoot quite a distance. Care must be taken to put the helm up and fill on her before she loses way, or she will get "in irons" and acquire sternway, or perhaps pay off on the other tack. If a boat acquires sternway the helm must be shifted at once. The rudder will now produce the reverse effect to what it would if the boat were going ahead. Putting the tiller to starboard turns the vessel's head to port, and *vice versa* in the case of sternway.

The beginner will find that his boat spins along quite merrily and obeys the slightest touch of the tiller. He should not relax his vigilance in the least, but should keep his weather eye skinned for sudden gusts of wind or catspaws which may be seen ruffling the water to windward, in timely season before they strike the boat. As the little craft begins to heel or list over to the pressure, luff up a little so that the fore-leech of the sail begins to shiver. If there is not weight enough in the puff to put the lee rail under, sail her along with just the suspicion of a shake in the luff of the sail, so that if she goes over far enough for the water to threaten to come over the lee coamings and deluge the cockpit you can put your helm down and luff up

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until the boat comes nearly head to wind, at the same time lowering away your sail and making preparations for taking in a reef.

If you are a novice, and the water is neither too rough nor too deep and the breeze seems likely to last, and you think your craft is not up to carrying a whole mainsail, there is no reason why you should not drop anchor and reef your sail in leisurely and comfortable fashion. If you feel at all nervous take in a couple of reefs.

After sail has been shortened set the mainsail, hoist up the anchor again and thresh her at it. You will observe that she inclines less to the puffs under the pressure of the reduced sail, and that the lee gunwale is always well clear of the water. Watch the boat well; look out for coming squalls, and be prepared to ease off the sheet and luff up instantly should occasion arise. If there are other boats in company with you tacking toward the same point you must remember that those on the starboard tack have the right of way, and thus when you are on the port tack you must keep clear of them. I would not advise a novice in a boat on the port tack to try and cross the bow of a boat on the starboard tack unless there is plenty of room. Distances on the water are deceptive to the tyro, and it is well to run no risk of collision. If the boat on the port tack will not keep away for you when you are on the starboard tack, and seems to be making for you with

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the intention of running you down, keep cool. Stand by to put your helm hard down so as to luff right up in the wind or even to go about. If you put your helm up and keep away, and a collision ensues, you would probably have to pay all the damage. The strict legal rule is that the vessel on the starboard tack must keep her course and neither luff nor bear up. If this rule is observed you will be within the letter of the law. In yacht racing a yacht on the port tack can be disqualified if she is struck by a yacht which is on the starboard tack, no matter how the striking happened; if she herself strikes a yacht which is on the starboard tack; if she causes a yacht which is on the starboard tack to bear away to avoid a collision. It is apparent, therefore, that no wise helmsman will run any risks. If he is on the port tack he will give way with a good grace and try to look pleasant. It is better than a collision, which is sure in a brisk breeze to do a lot of damage, and may possibly cause serious personal injuries or even loss of life.

The beginner may, after threshing to windward for an hour or so, begin to feel homesick. Let him then put his helm up, easing the mainsheet off at the same time until he gets the boom at a right angle with the mast and the boat dead before the wind. He will at this time have to pay particular attention to the steering, giving the boat "small helm" and giving it to her quickly in order to keep her steady on her course. Steer-

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ing a cat-boat in a stiff breeze and lumpy water requires both skill and experience. I should counsel a green hand to lower the peak of the mainsail and run her under easy sail until he acquires the art. In that case, should he accidentally gybe the boom over, the result is not likely to be particularly disastrous; whereas, if the sail were peaked up, the boom might snap in two or the boat herself might broach to.

The centerboard should be hoisted up into the trunk when running before the wind, and the boom should be kept well topped up. In some small cat-boats there is no topping lift and the sail has only one halyard, which hoists both the throat and peak. This is a faulty rig. Throat and peak halyards should be separate, and a topping lift should always be fitted.

I think it my duty to warn the inexperienced boat sailer against gybing his little craft. It is a maneuver that requires skill and care, especially in a brisk breeze. If you must gybe, lower the peak so as to "scandalize" the sail, and haul the boom well aboard as the helm is put up. As the wind shifts from dead astern and comes on the other quarter, carrying the boom over, ease off the sheet handsomely and take care to meet her promptly with the helm as she flies to, which is invariably the case. You can then hoist the peak up again.

If you have women and children aboard the boat, gybing should never be resorted to if the wind is strong. It is

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far preferable to luff up into the wind and tack and then keep off again.

In coming to anchor or picking up moorings make the boat describe a good sweep, so that she may come up in the wind and lose her way exactly where you wish. You can then either let go the anchor or pick up the moorings, as the case may be. Then lower the sail, furl it snugly, put on the sail cover, stow away everything neatly, haul taut the halyards and the mainsheet, which you should coil up, and leave everything tidy and in readiness for getting under way next time.

When, on a wind with a light breeze and in smooth water, it becomes necessary to heave to to let a boat come alongside, haul the mainsheet flat aft and haul the fore and jib sheets a-weather. If in a fresh breeze, flatten in the mainsheet, let the jib sheet flow, and haul the fore sheet a-weather.

For small open boats the anchor should weigh one pound for every foot of length up to twenty feet length. If the boat is ballasted, another half pound per foot should be added.

If you have the misfortune to get stuck fast in the mud or on a sand bank, you must act quickly. If you ground while running before the wind, lower your sails at once. If you have a dinghy, run out your kedge anchor, with a line fast to it, astern into deep water and try to haul off. Work the helm to and fro. Run from side to side so as to loosen the boat from her

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muddy bed. If the tide is rising and your kedge does not drag, you will be sure to get off.

If you run aground while close-hauled, let go the mainsheet, put the helm hard over and try to back her off with the jib, at the same time using a boat-hook or oar to try to shove her into deep water. If you have any passengers, concentrate all their weight as far aft as possible. Send out a kedge, and let all hands clap to on the line. If the tide is on the ebb, you may probably have to wait till high water. Now comes a ticklish crisis. If your craft is beamy, with full bilges, she will take the ground and lie easily as the water recedes. If, on the other hand, your little ship is of the deep and narrow kind and is not provided with "legs," you will have to improvise something in that direction to prevent her from careening on her side. "Legs" are not fashionable on this side of the Atlantic. They are props of wood shod with iron, one end of which rests on the bottom, while the other fits under the channels, or is lashed to a shroud. If you have no other spar available, unbend the head of the mainsail from the gaff. Stick it in the mud jaws downward close to the rigging and lash it firmly to a shroud. List the boat over to the side the gaff is out by guying over the boom and putting any extra weight you happen to have on the same side. The boat will then take the ground in safety.

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IV.

THE YAWL RIG.

THOUGH I recommend the catboat as a general craft for knocking about and having a good time in, I am not blind to the advantages of the yawl rig. In fact, the bold young seaman contemplating long cruises and sometimes venturing out of sight of land will find that the yawl rig possesses no mean merit. For single-handed cruising its worth has long been recognized. The sails are so divided that they are small and easy to handle, but this division of sail inevitably decreases the speed and also the weatherly qualities of the boat. If we take a catboat and change her into a yawl rig she will not be nearly so fast, nor will she point so close to the wind. There are fathoms of scientific reasons for this with which I will not bother my readers. Suffice it to say that it has been demonstrated practically over and over again.

But although the yawl-rigged sailing boat of the smallest type has at least three sails—foresail, mainsail and mizzen—yet the last named, after once being set, practically takes care of itself. The mainsail, too, is quite easily handled, the whole sail being in the body of the boat. The foresail sometimes gives a little annoyance in taking it in, if the

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boat is pitching her nose under in a steep sea. This, however, is unavoidable. Headsails on all sailing vessels, big or little, have never been conducive to dry skins under certain conditions of wind and sea. The yawl is always under control, and in this attribute lies her chief charm. When a squall is bearing down all one has to do is to lower the mainsail and pass a tyer or two round it to keep it muzzled. When the gust strikes the boat she is under easy sail and is not likely to come to grief. If the squall is of exceptional strength, ease off the foresheet and keep the sail shaking a little until you have felt the full strength of the wind. Act then as judgment may dictate. If the blow is very heavy and seems likely to last it may be necessary to take in the foresail and the mizzen, and close reef the mainsail.

If you are sailing with the wind a-beam and a squall smites you it may not be necessary to lower the mainsail at all. Ease the sheet right off so as to spill the wind, and you will pass safely through the ordeal without parting a rope yarn.

In getting under way or in working up to anchorage in a crowded harbor or roadstead the yawl rig is one of the handiest known, for by having the mainsail furled the speed of the boat is reduced so that you can pick your way among the craft without danger of collision or striking flaws. So many famous cruises have been made in small yawl-rigged craft that there can be no doubt about their adaptability for such

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work, and to the man anxious for more ambitious achievement than merely sailing in rivers, bays and sheltered harbors, I most certainly would recommend the rig.

Despite the yawl's certain safety for single-handed cruising, I am not in favor of sailing by myself. I prefer a congenial companion to share whatever pleasure or peril may be encountered. Of course one must exercise some wise discrimination in the choice of a cruising companion; for when once at sea there is no way of ridding yourself of an objectionable mate except throwing him overboard, which would not be exactly fair to him. Besides, he might throw you overboard, which would be bad for you. There are, however, hundreds of good yachtsmen and boatmen who have made long voyages alone and have written charming accounts of their nautical expeditions. John McGregor's "Voyage Alone in the Yawl Rob Roy" and E. Middleton's "Cruise of the Kate" (also a yawl) are two entertaining books of sea travel which I heartily recommend to those who contemplate sailing by themselves.

While I am in favor of a catboat for general purposes in the neighborhood of New York, yet when long distance trips are to be made the yawl rig will, on the whole, be found preferable.

That keen sportsman, Mr. W. H. H Murray, is a firm believer in the yawl rig for cruising. In OUTING for May, 1891, there appeared a most valuable

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article from his facile pen entitled "How I sail *Champlain*." The *Champlain* is of sharpie model, thirty feet on the water-line. She is of remarkably strong construction, her oaken keel being sixteen by twenty inches amidships and tapering properly fore and aft. Through this keel is sunk a mortise four inches wide and sixteen feet long, through which the centerboard works. This "fin" is of oak planking thick enough to easily enter the case when hoisted, but leaving little space between it and the case when in use. The centerboard is sixteen feet long, four feet deep forward and seven feet aft, and it has fifteen hundred pounds of iron for ballast. Mr. Murray says: "When the centerboard is lowered this mass of metal is eight feet below her water-line, and guarantees a stability adequate to resist any pressure which the wind can put upon her sails and the sails withstand. Of course I am speaking with the supposition that the boat receives, when under stress, judicious management."

The centerboard, which weighs two thousand pounds, is lifted by a "differential hoist," by means of which "the helmsman, with one hand on the tiller, can, if need occurs, with the other easily run the heavy board rapidly up into the case. The value of this adjustment can only be appreciated by a cruising yachtsman. It places him in perfect control of his craft under all conditions of varying depth of water and difficult

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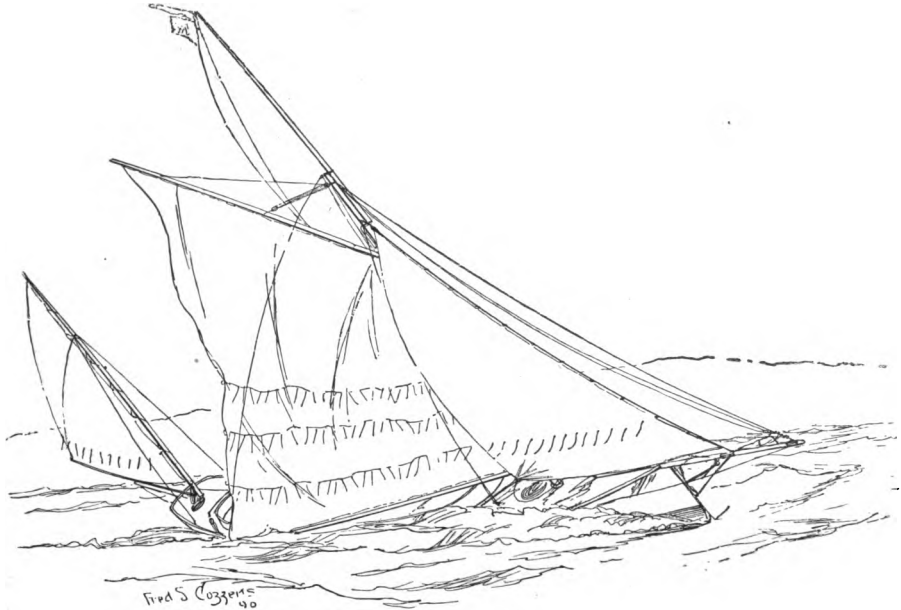

YAWL IN A SQUALL.

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weather. In a heavy seaway; in rapidly shoaling water on an unknown coast; when suddenly compelled to beat up against a swiftly flowing tide; or when finding himself unexpectedly near a reef, unobserved through carelessness or not plainly charted—this hoist is simply priceless. It is not over expensive, and can easily be adjusted to any yacht."

The cockpit is roomy, and, because of its high coamings, is also deep. The cabin is sixteen feet long, the forward half being permanently roofed. The after-half of the cabin is constructed, as to its roof, in equal divisions. The forward-half is tracked, and the after-half is grooved to run upon it. Mr. Murray finds this arrangement most convenient. as it gives to the yacht such coolness and comfort as cannot be obtained in a cabin permanently roofed. The whole roof is so fitted to the coamings that it can be quickly and easily removed and stowed, leaving the yacht to be sailed as an open one, decked from stem to midship section. This arrangement is an admirable one for harbor sailing in bright weather or for racing.

Regarding the handiness of *Champlain* Mr. Murray says: "All yachtsmen know what a disagreeable job it is to reef a sloop or cat-boat in rough water, and from this cause many skippers will delay reefing as long as possible and often until too late. And because of this many accidents happen yearly. In this respect the yawl rig

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shows to the greatest advantage and commends itself to all sensible yachtsmen. For when the moment has come to reef, if the boat is running free her head is brought up to the wind, the mizzen and jib sheets trimmed in, and with the main boom well inboard the pennants are lashed and the reef points tied down, when she is let off again and goes bowling along on her former course. In *Champlain* the three reef cringles on the leech of the mainsail are all within easy reach from the cockpit, and the skipper, without leaving the tiller, can lash the pennants, and hence, with only one assistant, the three reefs can successively, if need be, be tied down. Indeed, so well do the jib and mizzen sail work in unison, that unless the wind is very puffy and variable, the helm can be lashed and she will hold her course steadily onward while the skipper is tying down the after reef points. It is a matter of pleasant surprise to one not accustomed to this rig how easily and rapidly a reef in most trying conditions can be taken in the mainsail of a yawl whose sails are well balanced.

"Moreover, unless the squall is a very heavy one, a yawl can be eased through it without reefing at all. For when the wind comes roaring down and the white line of froth and spray is right upon you, the boat can be brought up to the wind and the mainsheet eased handsomely out, and with jib and mizzen drawing finely and the mainboom off to

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leeward the wind whistles harmlessly between the masts, while the yacht, only slightly disturbed in her balance, sails steadily along. Or, if the squall is a heavy one and there is no time to reef down before it strikes, the yacht can be luffed up, the mainsail let down at a run, and with the belly of the sail held within the lazy-lines the yacht is under safe conditions. But ordinarily it is better to reef or even tie down the mainsail snugly, and as in a yawl it can be done rapidly and easily there is no reason why it should not be done and everything be kept shipshape.

"In cruising I often sailed *Champlain* under jib and mizzen alone, with the mainsail stowed and the boom crutched and tied snugly down amidships, especially in the night time when it was very dark and the weather foul. Under this scant canvas with a favorable wind she would sail along at a very fair rate of speed and even make good progress in beating up against quite a sea, and I need not say that it adds greatly to the pleasure of cruising in a small yacht with only one man for your crew to feel that you have your boat in a condition of perfect control. It is evident that with no other rig can this condition to the same degree be obtained or such a sense of absolute security be enjoyed.

"To an amateur nothing is more trying than coming to or getting away from moorings, especially if the wind is blowing strongly and the anchorage ground is crowded with other yachts,

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not to speak of vessels of commerce, bateaux, tugs and ferryboats. Under such circumstances it is no easy matter for any, save an expert, to work a sloop or cat-boat or schooner safely out through the crowded harbor or basin to the open water beyond; and it is all the more trying to a skipper if there is a strong tide running at the moment. But with a yawl the difficulties of the situation are almost wholly removed. For with mainsail unlashed he can hoist his anchor or cast off from moorings, and under his two small sails work his boat out slowly and safely from the jammed basin or crowded space within the breakwater. He must be a tyro indeed who cannot safely manage a yawl under the worst possible conditions of this sort.

"In cruising, if the weather is threatening it is well to carry a single reef in the mainsail until it clears up, for a yawl works well under such a sail with jib and mizzen furled. In such trim the yacht is as a cat-boat with a small sail, and as her main boom is shorter than a cat-boat's or a sloop's she can be worked in a very heavy sea with her boom's end well above the rollers. And I know of nothing more trying to a skipper than to sail his craft with his boom's end half the time under water. In such a condition the spars, rigging and boat are under a stress and strain which every prudent skipper dreads and seeks to avoid, and it speaks volumes in favor of the yawl rig to say that with it

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such a trying condition can never arise. Indeed a yawl under a double-reefed mainsail alone is in perfect trim for scudding. If well modeled she will neither yaw nor thrash the water with her boom's end, but career along almost with the speed of the wind itself. For her canvas is low down, as it should be, and her boom carried well above the seething water. In this shape, moreover, she can lay a course with the wind well over her quarter without strain, and it must be a very hard blow and rough water indeed to give anxiety to any on board of her."

That the *Champlain* is a capital sea-boat is beyond question. Her owner thus describes a run on the lower St. Lawrence in returning from a cruise to the Saguenay: "We passed Baie St. Paul in the evening, whirled along by a rising gale blowing directly up the river. The night was pitchy dark, the tide running fiercely on the ebb at the rate of five miles an hour at the least. The water was very wild, as one can easily imagine. Stemming such a current it would not do to shorten sail if one wished to pass Cape Tourmente and get into quiet water, the Isle of Orleans and the north shore, so we let every sail stand, cleated the sheets tightly and let her drive. How she did tear onward! The froth and spume lay deep on her pathways and after-deck. The waves crested fiercely, rolling against the current, and the black water broke into phosphor as we slashed through it. I

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do not recall that I ever saw a yacht forced along more savagely. How the water roared under the ledges and along the rough shores of Tourmente! And I was profoundly grateful when we were able to bear off to starboard and run into the still water back of Orleans. Perhaps that midnight cup of coffee did not taste well! Its heat ran through my chilled veins like Chartreuse. I can taste it yet!"

The ordinary jib-and-mainsail rigged boat, as seen in the waters round New York, might easily be improved upon. In the first place, the majority of them are too much after the skimming-dish pattern to suit my fancy. Then the mast is stepped as a rule too far forward for the best work, and renders reefing difficult, as she will not "lay to" comfortably under her headsail, whereas if the mast of a boat is stepped well aft, cutter fashion, the boat will lay to quite well, and reefing the mainsail is easy. The American sloop rig is open to the same criticism, and that is why the English way of rigging a single-sticker has been adopted in all our new racing craft. To my mind there is nothing more hideous than a "bobbed" jib. It renders good windward work impossible, as it causes a boat to sag off to leeward and is in other ways a detriment. A small boat with the mast stepped in the right place and carrying a jib and a mainsail is, however, a very satisfactory craft, good at beating to windward as well as reaching or running. I should

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advise that a "spit-fire" or storm jib be carried along whenever a sail of any distance is contemplated, and also a gaff-headed trysail, so that the adventurous skipper may be always prepared for storm and stress of weather. This extra "muslin" takes up little room when properly rolled up.

The simplest and safest rig in the world is the leg-of-mutton sail. It is the one fitted exactly for river work, where one is sure to encounter puffs of some force as ravines are reached or valleys passed. To amateurs it is the sail *par excellence* for experimenting with, for no matter how many blunders are made a mishap is well nigh impossible. The leg-of-mutton sail has no gaff, nor need it have a boom. There is little or no leverage aloft, and all the power for mischief it has can be taken out of it by slacking off the sheet and spilling the wind. The learner might with advantage practice with a sail of this shape until he becomes proficient. If he eventually determines upon a jib and mainsail or yawl rig for permanent use, he may avoid wasting it by having it made over into a storm trysail.

I would strongly advise every amateur skipper to shun the ballast-fin device as he would shun cold poison or a contagious disease. That is unless he intends to go in for a regular racing career, in which case the cups carried off might possibly compensate him for the woe, the anguish and the premature gray hairs inseparable from this con-

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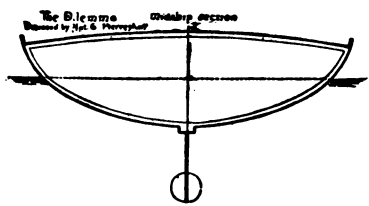
trivance. Mind you these remarks of mine apply only to amateurs and not to grizzled sailing-masters of yachts who fully understand how to navigate and handle all types of pleasure craft. Theoretically the ballast-fin has many obvious advantages.

TYPE OF FIN-KEEL.



The fin consists of a plate of iron or steel to the base of which is affixed a bulb of lead, which, being in the best possible place, insures stability. The fin proper gives lateral resistance in an almost perfect form, for there is no deadwood either forward or aft and the least possible amount of wetted surface. I remember when a little boy in a fishing village on the bank of a land-locked arm of the sea, where the water was always smooth, how we youngsters came to appreciate fully the worth of an improvised ballast-fin. We used to enjoy the diversion of model yacht sailing and the delights of many regattas.

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I owned one of the smartest models in the village. She was rigged as a cutter with outside lead, self-steering gear and all the latest maritime improvements, and she generally came out a winner. I tell you I used to put on a great many airs on this account, and as a natural result was duly hated and envied by my playmates, who owned more or less tubby craft that could scarcely get out of their own way.

But the day arrived when my pride was destined to have a fall. A shrewd youth of Scottish extraction came to our village for the summer with his father. He had the keenest, greenest eye you ever saw, and one of those money-making noses that are unmistakable. His whole physiognomy and form indicated shrewdness. He mingled with us for some time on the beach, mudlarked with the boys and watched our model yacht matches with undisguised interest. We all got the notion that he was an inland landlubber, though it is only fair to him to acknowledge that he never told us so in so many words.

One Saturday afternoon, after my little cutter had surpassed herself by distancing all her opponents, I indulged in some unusually tall talk, and challenged each and every one of my rivals to a race across the "creek," as the sheet of water was called, offering to give them four minutes' start, the distance being half a mile.

To my surprise, our green-eyed friend came along and accepted the challenge.

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saying that on the following Saturday he would produce a craft that would knock spots out of my cutter without any time allowance whatever, and without the aid of a longer hull or larger sailspread. He also remarked that he had a month's pocket money saved up, and was willing to wager it on the result. I accepted his offer without superfluous parleying, and in my mind's eye was already investing that pocket money of his in various little treasures for which I hankered. But, for all that, I made every preparation for the fray, using very fine sandpaper and pot lead till my boat's bottom was beautifully burnished, and seeing that her sails and gear were in tip top racing condition. All the boys wondered what sort of a craft my opponent would bring out. He had never been seen with a boat of any description. We laughed in our sleeves and whispered it about that he would probably produce one of those showy vessels that one sees in the city toy store, and that generally sail on their beam ends.

The hour for the race arrived. The boys were all excited and flocked to the water's edge, whence the start was to be made. There was a goodly throng of them present, and, notwithstanding their contempt for the Scotchman, it was no doubt the desire of their hearts that some of my overweening conceit should be taken down a couple of pegs or so. Presently my rival appeared on the scene, carrying in his arms the

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queerest looking craft any of us had ever seen. Her hull was shaped like an Indian birch bark canoe, except that to the rounded bottom a keel was fastened. A groove was made in the keel, in which an oblong piece of slate was placed, to the bottom of which a strip of lead was secured. The rig was that of a cutter, and I noticed that her sails were well cut. She looked quite business-like, and when she was measured we found she was two inches shorter than my cutter.

There was a nice, fresh westerly wind blowing, and quite a loop of sea running for diminutive craft such as were about to race. I had already deemed it prudent to take in a reef in the mainsail of my vessel, and set a No. 2 jib, but my Scotch friend said he thought his boat would carry whole sail without any trouble. The course was south, so the craft had to sail with the wind a-beam. The start was made, my boat being to windward, as I had won the toss. And that was all I did win. The "ballast-fin" craft beat my cutter so badly that even at this distance of time my ears tingle and I feel ashamed. While my boat was burying herself, her rival took the curling wavelets right buoyantly, standing up to her work valiantly, and moving two feet to the cutter's one. We accompanied the model yachts in row-boats, keeping well to leeward, but quite close enough to observe their movements accurately. That was my first experience of the ballast-fin. We all became converts, and shoal, round-

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bottomed craft with slate fins to give stability and lateral resistance, were thenceforward the fashion. My successful rival, we afterward discovered, was the son of a naval architect of repute, and he is now practising his father's profession with a good deal of success.

Thus I have not a word to say against the ballast-fin so far as racing is concerned, but in cruising the average man who sails for pleasure wants a craft that he can haul out of the water easily to scrub, clean and paint. Now, if you put a ballast-fin boat on the mud for any one or all of these purposes she requires a "leg" on each side to keep her upright, and also supports at the bow and stern to prevent her from turning head over heels. The stationary fin always represents your true draught of water. It is always with you, and is an integral portion of the boat's hull. If you happen to get stuck on a shoal—and this is a contingency that has occurred frequently to the most skilful and careful navigator—in thick weather, for instance, your lot is by no means to be envied. This is particularly true if the tide is falling fast. The boat would go over on her side as soon as the water got low enough. The crew and passengers might have to wait aboard until high water, and a precious uncomfortable time they would pass I am certain. When the flood tide made it might be a moot question whether the boat would float or fill with water.

The movable centerplate will always

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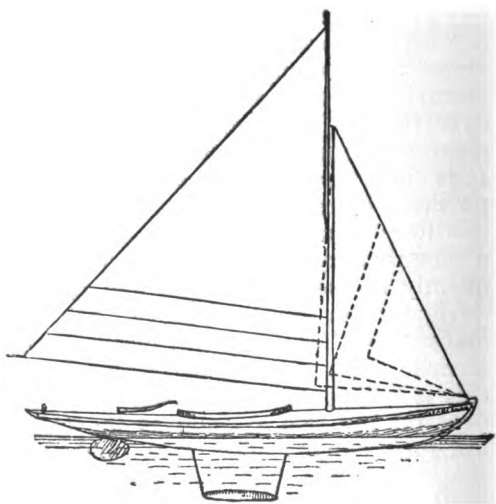
let you know when you get on a shoal, and will in nearly all cases give you warning in time to avoid grounding, which is always an unpleasant predicament, and one entailing much labor. Then, again, the anchorages at which small boats can safely lie are generally pretty shallow at low water and the ballast-fin is found to be mighty inconvenient for such places.



SAIL PLAN OF FIN-KEEL.

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V.

THE KNOCKABOUT CLASSES.

THE knockabouts, which had their origin in Boston, have much to recommend them. They are free from freakiness. None of them at this time of writing have been fitted with fin-keels to harass their skippers when they come in contact with the ground. They have a moderate sail area, and thus are under control at all times. In a blow one is as safe aboard one of these craft as a converted Chinaman under the lee of his fair Sunday-school teacher at church-time. The variety in vogue in Boston in 1897 was limited to 500 square feet of sail. All were keel boats, 21 feet being the limit of length on the load water-line.

This class gained popularity from the intrinsic excellence of the boats themselves, combining capital cruising qualities with fair speed and good accommodations. Several designers competed, the restrictions governing their construction, dimensions, and sail area being such that the boats were very even in speed, and the contests in which they took part were keen, close, and exciting.

The type of knockabout chosen for the season of 1898 by the Seawanhaka

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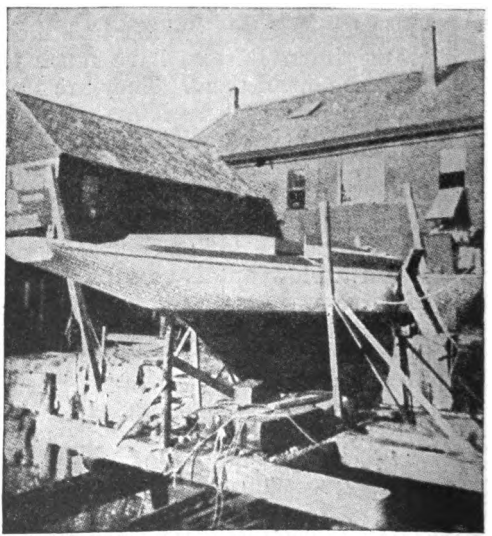
Corinthian Yacht Club and the Westchester Country Club has proved to be quite admirably adapted for cruising and racing. They were designed and built by Mr. W. B. Stearns, of Marblehead, their dimensions being: Length over



SEAWANHAKA 21-FOOT KNOCKABOUT.

all, 33 feet; on the load water-line, 21 feet; beam, 8 feet 8 inches; draught, 4 feet; with board down, 7 feet. The area of the mainsail and jib contains 550 square feet. The centerboard is a small one of iron, and houses below the cabin floor. The trunk cabin is 8 feet long, with 5 feet head-room. The price of

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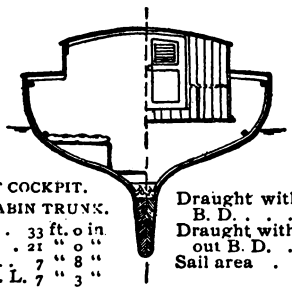
these boats was $750 complete, and, their construction being sound and strong, they will, if taken care of properly, be good for many years.

It is impossible to speak in terms too high of this class after a surfeit of the racing machines and freaks like the 20-footers whose alarming antics so often amused and amazed us whenever they happened to meet in a reefing breeze. Another good property they possess is that they look like boats when



SECT. AT COCKPIT.
SECT. AT CABIN TRUNK.

L. O. A.	33 ft. 0 in.	Draught with B. D.	7 ft. 0 in.
L. W. L.	21 " 0 "	Draught without B. D.	4 " 0 "
Breadth ex.	7 " 8 "	Sail area	550 " 0 "
" L W. L.	7 " 3 "		

SEAWANHAKA KNOCKABOUT.

hauled up on the beach, and can never be mistaken when their masts are unstepped for pig-troughs or fish floats. There is no doubt of the sea worthiness of these craft. They are perfectly safe in a northwest squall off Sandy Hook or in a dirty easterly gale on Long Island Sound.

Another craft of this type which was deservedly popular last year is of larger size than the one described above. She is 25 feet on the load water-line, 38 feet

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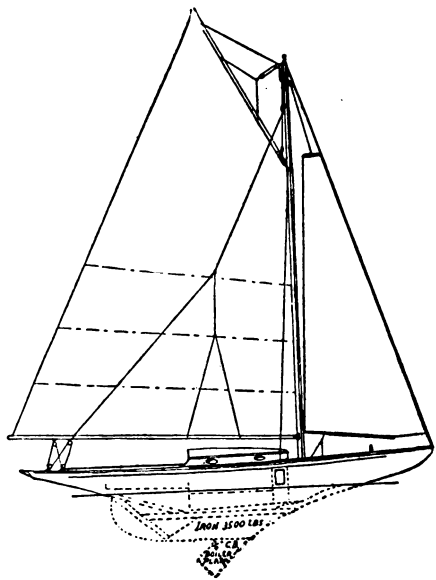
over all, with a beam of 8 feet 6 inches, and 5 feet draught with centerboard up. The boat, which was designed by Mr. B. B. Crowninshield, of Boston, has a commodious cabin with 6 feet head-room, a seven-foot cockpit, and 800



SAIL-PLAN OF SEAWANHAKA KNOCKABOUT—550 SQUARE FEET.

square feet of duck in mainsail and jib. A very able and roomy boat nearly twice as costly as the Stearns craft, but indeed quite a little ship.

Personally, I favor a short bowsprit in a knockabout, it being convenient for

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hoisting the anchor, keeping it clear of the hull, and preventing unseemly dents from the flukes.

I fear that knockabouts, or raceboats, even in restricted classes, are designed eventually to be fitted with fin-keels. As a speed-inducing factor the fin has fully demonstrated its capacity since the first edition of this little book appeared. I have not, however, altered my opinion one iota since my remarks on the ballast-fin made in the chapter which precedes this. In my judgment the fin is admirably adapted as an adjunct to a racing machine, but for cruising craft I like it not. Brand me for an old fogy, if you will; half a century behind the times, if it so pleases you, shipmates, but give me credit for sincerity.

The keen sense of rivalry inherent in every American will not permit him to be content with a good, honest sailing boat for cruising purposes only. If one of his chums comes out with a faster craft, whether a fin-keel or a modification thereof, he will become dissatisfied with his own boat, no matter how seaworthy and comfortable she may be, and will promptly discard her for a new-fangled design in which speed is the principal characteristic. The so-called restricted classes, which are so popular just now, are, I think, sure in the end to become purely racing classes, something after the fashion of the Herreshoff 30-footers now so fashionable in Newport. As racing boats, none afford more sport than these wonderfully smart flyers, and

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I can well understand what fascinating toys they have proved to their owners. But, after all, they are only toys, vastly expensive, too, with no accommodations for cruising, and apt to be uncomfortably wet in a breeze.

The one-design classes of small yachts are not confined to knockabouts only. Cruising schooners, designed by Cary Smith, made their appearance in 1898, and the class, from a modest beginning, seems likely to grow. The features of the boats are their sound and wholesome characteristics. They possess moderate draught, large accommodations, and strength of construction. They are 64 feet 2 inches over all, 46 feet long on the load water-line, 16 feet beam, draught without board 6 feet 6 inches, least freeboard 3 feet. A rather low cabin trunk gives full head-room for the greater part of the yacht's length, the main saloon being more than 13 feet long, with a floor width of 6 feet 9 inches. On each side are two berths and two sofas with drawers beneath. There is accommodation in the forecastle for four men. The yachts carry 20,000 pounds of lead ballast, of which 18,000 pounds is on keel. Another one-design division is the Riverside Yacht Club dory class, which has been adopted by many of the clubs enrolled in the Yacht-Racing Union of Long Island Sound. These boats are thirteen feet on the keel, seventeen feet over all, with four feet beam, fitted with a centerboard and rigged with small jib and a

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leg-of-mutton sail. They are for single-handed racing, but for pleasure cruising or fishing a man can take his chum along. Fully equipped with oars, sails, etc., they cost about forty dollars, and afford capital sport on fine afternoons. To encourage this little class, prizes worth winning are offered by the club, and sweepstake races are popular features.

The idea was probably taken from the Nahant Dory Club, organized in 1894, which did much to encourage sport in this serviceable and inexpensive class. Spectators will find amusement in watching "green hands" in their maiden efforts at sailing these dories, as strange and startling results often follow the rash experiments of an adventurous tyro. But apart from the comic element, valuable lessons in yacht-racing may be learned by steering and manœuvring a dory against a fleet of half-a-dozen eager competitors. Thus, yachtsmen cannot help approving this new Riverside venture, originated, I believe, by Mr. F. Bowne Jones, of the Regatta Committee.

The origin of the one-design class was Dublin Bay, where the "Water Wag" type was fire evolved. A Norwegian praam with a boiler-plate centerboard, combining ballast and lateral resistance, and carrying a big sail, was built in 1878 at Shankhill. She was christened *Cemiostama,* and proved an ideal boat. The conditions were a sloping sandy shore on which the high surf not infre-

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quently broke, and from which the craft had to be launched every time her owner wanted a sail, and onto which she had to be beached after the cruise was finished. *Cemiostama* was a capital sea-boat; she pointed well, hit what she aimed at, did not sag off to leeward, and was quite fast. When the centerboard, weighing about one hundred pounds, was raised, she ran up easily on the beach, resting quietly on her flat bottom. Her centerboard was then lifted out, and her crew of two hauled her up.

The knowing Irish yachtsmen, appreciating a good thing, saw that there was a lot of fun in a boat of this class, and several were built, and many scrub races were indulged in. In 1887 the Water Wag Association was started, the craft being built on the same lines, and the sail-area being limited. Their dimensions were thirteen feet in length, with a beam of four feet ten inches, full lines and a flat floor.

The Water Wags are presided over by a king and a queen, bishop, knights, and rooks; and, although the boats were at first used principally for pleasure, they are now racers, pure and simple. Their headquarters are now in Kingstown Harbor, and prizes are put up for them at all the local regattas. They are very handy, too, and quite admirable for the purpose for which they were designed. They cost from $75 to $100, and the rules that govern their races provide that they shall be similar in every respect except sail-plan. The mast must

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not exceed thirteen feet over all, measured from top of keel to truck; the fore and aft sails must not exceed seventy-five square feet in area, and the spinnaker (which is to be used only before the wind, and never as a jib) must not exceed sixty square feet.

Each boat shall carry no less than two or more than three persons in a race, all of whom shall be amateurs. A member or any lady may steer. No prize shall be awarded a boat for a sail-over, but she may fly a winning flag therefor. A pair of oars and a life-buoy must be carried in every race. It is only right to mention that these sailing regulations are vigorously enforced.

The latest one-design class established by our rollicking Irish cousins is known as the 25-footers of the Dublin Bay Sailing Club. These craft are of such noteworthy type as to deserve a few lines of description and approval here, especially as it was wisely decided that the type shall not be altered for five years from January 1, 1898. The boats, of which quite a number were built and raced, are deep-keeled cutters of the following dimensions: Length over all, 37 feet 3 inches; length on load water-line, 25 feet; beam, 8 feet 8 inches; draught, 6 feet 3 inches; lead on keel, 3 tons 5 cwt., and sail area, 845 square feet, divided into a mainsail laced to the boom, gafftopsail, foresail and jib. A second jib, jibtopsail, balloon foresail, spinnaker, storm jib and trysail may also be carried. The design,

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made by Will Fife, Jr., of Fairlie, is handsome, the type being eminently adapted for Dublin Bay. Restrictions of the strictest kind ensure the boats being exactly alike in size, material, construction and canvas.

The "Mermaids," a craft much used by the B division of the same club, are large Water Wags, 18 feet long, with 6 feet beam, fitted with certerboards, but carrying no ballast, and limited when racing to 180 square feet of sail. These are vastly popular, and a dozen or so race every Saturday afternoon during the season.

Although one-design racing originated on the other side of the Atlantic, it is questionable if any one class has been sailed with more spirit or persistency than were the Herreshoff 30-footers at Newport during the yachting season of 1897 and since.

That the classes are destined to prosper there is no doubt, the only condition being that the type must be carefully adapted to the location for which it is intended, and the more it is available for fishing excursions and pleasure trips the greater favor will attend it. Another helpful feature is the substantial economic gain from the construction of several boats by the same builder from the same design.

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VI.

FITTING OUT FOR A CRUISE.

IN equipping a boat for a cruise, even in summer, it is always well to remember that gales of wind are not unusual even in July. I once knew it to blow with spiteful ferocity in the last week of that month, and to disperse the Atlantic Yacht Club squadron and drive them to seek shelter in various harbors of Long Island Sound, between Black Rock and New Haven. Out of the whole fleet only two yachts reached their destination, New London. One was the sloop *Athlon*, Vice-Commodore E. B. Havens, on board of which I was a guest, and the forty-footer *Chispa*. It was quite an exciting and hard thrash to windward in the teeth of an easterly gale, but we got there. Had not the two yachts mentioned been properly prepared for such an exigency, they also would have been forced to bear up and run for some land-locked haven in which to linger until the wind had blown itself out. Although these summer gales generally exhaust themselves in twenty-four hours, they are often quite savage while they last, and the sensible yachtsman will always be prepared to meet them. His standing and running rig-

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ging will be in first-class condition; whatever storm canvas he carries will be ready for bending at a moment's notice; his sea anchor or drogue will also be at hand for letting go should the necessity arise.

Of course I need not impress upon the amateur boat sailer that a compass should be taken along on a cruise. But I have mingled a good deal with the owners of small craft, and have met many who either did not carry one at all or, if it was aboard, as likely as not stowed it away in the same locker with a hatchet, marlinespike and other tools not likely to improve it. A compass should always form part of a boat's outfit. A fog often makes its appearance when a party of pleasure seekers are enjoying a sail on sound or bay, and when it shuts down on you thick as a hedge I will defy you not to lose your bearings, and consequently your way. In times such as these a compass will prove a source of great comfort, and instead of being compelled to anchor and await clear weather you can steer for your destination under shortened sail. In such cases never fail to blow the foghorn, which should be of regulation size and not a penny squeaking trumpet such as a six-year old schoolboy affects. The ordinary boat's compass will answer admirably if only short sails are contemplated, but on a long cruise where a heavy sea is not unlikely to be encountered, a fluid compass should be carried. The motion of a small craft in rough

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water causes the common compass card to jump about so much as to be perfectly useless to steer by, while a fluid compass remains steady and reliable under all circumstances and conditions. There are several fluid compasses in the market at a reasonable price, which can be depended upon in an emergency. The fluid on which the needle floats is generally alcohol, to guard against freezing, and is simply a development of a primitive compass used by the daring seamen of the twelfth century. This old-fashioned instrument consisted of an iron needle, one end of which was stuck into a piece of cork. The other end was well rubbed with a loadstone, and when the cork was floated in an earthenware bowl of water the end so treated pointed to the magnetic North. In spite of the meager knowledge of those early navigators concerning variation and deviation, they generally managed to make a sufficiently good land-fall. It may not be generally known that a sewing needle rubbed on a magnet and carefully dropped into a vessel of water will float and point to the North.

The rule of the road at sea requires vessels in a fog to go at a moderate speed and to blow the foghorn at intervals of not less than two minutes; when on the starboard tack one blast, when on the port tack two blasts in succession, and when with the wind abaft the beam three blasts in succession. It also has certain imperative rules for a vessel at anchor in a fog.

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The law provides that a vessel not under way in a fog shall at intervals of not more than two minutes ring a bell. It will be seen therefore that a bell is quite as necessary as a foghorn. If a boat at anchor or under way in thick weather, with neither bell nor foghorn in use as provided by the law, should be run into and damaged or sunk by any other vessel, her owner would have no redress. On the contrary, if he escaped with his life he could be forced to pay for any damage, however trifling, the vessel colliding with him sustained in the act. If he was drowned his estate would be liable.

A bell should form part of the careful boatowner's outfit. But if you have neglected providing one, don't despair. Get out a frying pan or a tin kettle and kick up as much racket as you can by beating one or both with a hammer or a marlinespike. A fishhorn has many times answered the purpose of a foghorn, but I would not recommend it as a steady substitute. All I wish to convey is that a frying pan and a fishhorn are better than nothing.

The variety of anchor to be carried depends very much upon choice. There are several kinds for sale quite suitable for small cruisers, all of which have good points to recommend them.

The law is imperative as regards the carying of lights by night when at anchor or under way. If your craft is very small, there is a light in the market fitted with green and red slides to be

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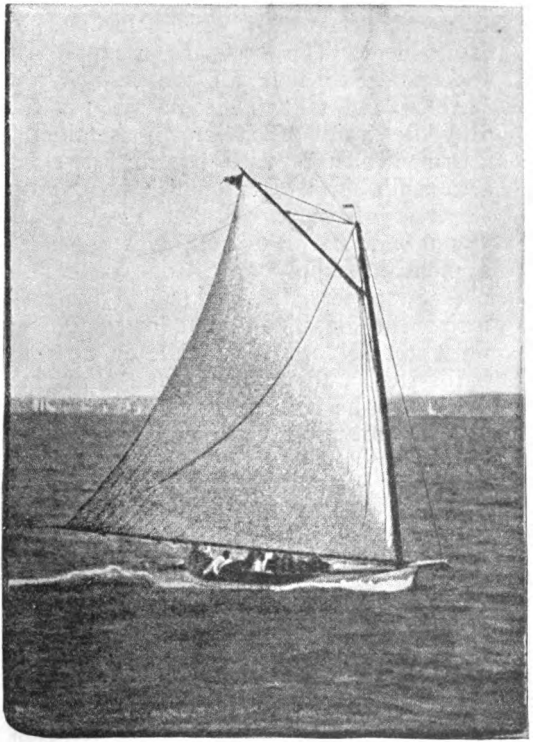

PLEASANT CAT-BOAT SAILING.

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shown when required, which may suit your purpose. But if your craft has any pretensions to size provide yourself with a pair of brass side lights and also a good brass anchor light. Avoid those flimsy articles with which the market is flooded. The best are cheapest in the end. See that all the lamps you have aboard take the same sized wick. Buy the brand of oil known as mineral sperm, which is used by all first-class steamship lines. Its quality has borne the test of years and has never been found wanting. For lamp cleaning take a plentiful supply of cotton waste and old newspapers, the last named for polishing the glass. A hand lead and line must not be forgotten, while an aneroid barometer, a thermometer and a marine clock with be both useful and ornamental. Do not forget a canvas bucket and a deck scrubber.

A few tools will be found necessary. A hatchet, hammer, chisel, file, jackknife, gimlet, screw driver, small crosscut saw and an assortment of screws and nails will be about all that is essential in this direction. A few yards of duck, palm and needles and sewing twine, a ball of marline, one of spun yarn and a marlinespike may be stowed away snugly, and their possession in case of need is often a great boon. The adventurous voyager must use his own discretion as to his wardrobe. The marine "dude" is in evidence in our midst, and who am I that I should condemn a man for trying to look his

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prettiest both ashore and afloat? Don't forget to buy a good suit of oilers, and don't fail to slip them on when it rains. When you come to get to my age, and feel the rheumatism in your old bones, you will wish you had followed my advice.

Tastes differ so widely that it is hard to advise a man as to his *cuisine* when afloat. What would suit an old sea dog "right down to the ground" might not be palatable to the nautical epicure with a taste for humming-bird's livers on toast, or other such dainty kickshaws. Personally, I can enjoy a good square meal of sardines and hardtack, wash it down with a cup of coffee and wind up with a pipe of plug tobacco, and conclude that I have feasted like a prince. This is probably due to my forecastle training. Others are more fastidious. Luckily this is the age of canned viands, and almost every delicacy under the sun is put up in convenient form, requiring only a can-opener to extract the hidden sweetness.

The culinary difficulty that confronts the sailor of small craft is the cooking stove. Like the servant girl problem, it is still unsolved. Many great geniuses have wasted the midnight oil and have nearly exhausted the gray matter of their brains in trying to invent a stove that shall be suitable for a little cockle-shell of a boat with a penchant for dancing over the waves in lively style. Some have tried cast-iron stoves with a smokestack, and coal for fuel, and have

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cursed their folly ever after. Gasoline stoves, so long as they don't explode and set fire to the boat, are convenient and cleanly. Various kinds of alcohol lamps, hung on gimbals to accommodate themselves to the perpetual motion of a vessel, are in use, and are thoroughly adapted for making a pot of coffee, tea or chocolate, and for heating a can of soup or preserved meat. A hungry boatman should not ask for more luxurious fare. There are preparations of coffee and milk, and cocoa and milk, in cans, which can be got ready in a hurry and with the least possible trouble. They are also nice, and I do not hesitate to stamp them with the seal of my approval. By looking over the catalogue of the canned goods of any first-class grocer, you will find a quantity of varieties to select from, all of excellent quality and moderate in price. In order to provide against waste, it would be advisable if cruising alone to buy the smallest packages in which the viands are put up. Hardtack should be kept in airtight tin boxes to guard against damp. Matches can be stowed in a glass fruit jar, and in this snug receptacle defy salt spray and sea air which threaten the integrity of brimstone and phosphorus. The man who indulges in tobacco (and what lover of the sea does not?) will find it well to pack a supply of wind matches in a glass jar, so that he can keep his match safe replenished and be able to light his pipe or cigar no matter how the breeze may blow. I have found tobacco a

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mighty source of comfort under adverse mental and physical conditions, and its soothing influence has made many a trick at the tiller seem less weary.

Cooking in a small craft tossed like a cork on the waves is a confounded nuisance, but a hot meal tastes well after you have been stuck at the tiller for four or five hours in squally weather. I remember an incident that occurred on board my cutter, the *Heather Bell*, when ingenuity provided a hot breakfast which otherwise we should not have enjoyed. We were caught in a southerly gale in the English Channel, and under trysail and spitfire jib we were doing our best to claw off a lee shore. I had been at the tiller nearly all night, and when day broke I was thoroughly exhausted. The little cutter —she was only fifteen tons—was pitching and 'scending at such a lively rate that lighting a fire in the stove was out of the question. My chum, however, managed to make some coffee with the aid of a spirit lamp, and also to cook a couple of plump Yarmouth bloaters. This last-named feat was difficult, but my chum was a man of genius. An inspiration came to him. He split the bloaters down the backs, put them in an extra deep frying pan, such as should always be used at sea, deluged them with Scotch whiskey, old and smoky, and set fire to it. I can see him now, hanging on to the cabin ladder with one hand and balancing the frying pan in the other, so that the blazing

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whiskey should not overflow and set fire to the cabin. Those bloaters were fine. They went right to the spot. It was rather an expensive mode of cooking, for the whiskey in question was choice, but we both agreed that the fishes were worthy of it. I suppose they would have tasted just as well if they had been cooked in alcohol, but that idea did not occur to my friend. A beefsteak prepared in the same way was delicious. We had it for dinner, and soon after there came a shift of the wind, which enabled us to run for Newhaven and sleep comfortably.

You should take with you a box of seidlitz powders, a bottle of vaseline, court plaster, a box of your pet pills, a bottle of extract of witch hazel, a bottle of extract of ginger, a bottle of *Sun* cholera mixture, and a bottle of Horsford's acid phosphate. These should be stowed away in a medicine-chest, which, if you have any mechanical skill at all, you can make yourself. If you are no hand at a saw or a chisel, a small medicine-chest, filled with all the requisites and adapted for use in a boat, can be obtained from any good drug-store at a reasonable figure.

A locker for the storage of ice is indispensable for one's comfort when sailing in these latitudes in summer. The locker should be lined with zinc, and should be fitted with a brass tap to draw off the waste water. Wrap your ice up in paper first, and then in a piece of coarse flannel, and you will be surprised

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at the length of time it will keep. A porous earthenware bottle should form part of your equipment. It can be suspended in the draught, and will supply you with a moderately cool drink when your ice is all used.

Remember that sea air generates damp very quickly in a cabin. Bedding should be aired and sunned if possible every day, and the cabin should be well ventilated. Cleanliness and comfort go together in a boat, and scrubbing-brush and swab should not be allowed to get dry-rot by disuse. Cultivate order and tidiness so far as the domestic economy of your yacht is concerned. Have a place for everything and everything in its place, or your little cabin will present a slovenly appearance instead of looking pretty and snug.

If the interior of your cabin is painted white, use enamel paint, which dries hard and smooth, and can be easily cleaned by washing with warm (not hot) water, soap and sponge.

Cocoa-nut matting is better than carpet or oil-cloth as a covering for a small craft's cabin floor. It is difficult to dry carpet when it gets thoroughly drenched with salt water. Oil-cloth is comfortless and cold to bare feet, but cocoa-nut matting is open to neither of these objections. It is easily washed and dries quickly.

The cushions for the cabin may be stuffed with cork shavings or horse-hair and covered with india-rubber sheeting. These may again be covered with cor-

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duroy or blue flannel, as the india-rubber sheeting is cold. Mattresses made of deer's hair are in the market, and are quite comfortable. Being buoyant, they can be used as life-savers in an emergency.

Cups, saucers, plates and dishes of enameled iron or agate ware are unbreakable and much superior to those of tin, which rust and are hard to keep clean. Cookery and glassware are easily destroyed in a cruising craft, in spite of the ingeniuos racks and lockers invented to preserve them.

Don't omit to include fishing tackle among your stores. There is lots of sport in catching blue-fish or mackerel when under way, and many a weary hour when your craft is becalmed may be beguiled with hook and line. Besides, a fish fresh from the water forms an agreeable and appetizing change from the motonony of canned goods. There is no necessity to purchase expensive tackle for sea-fishing. All that is wanted is strong and serviceable gear. For blue-fishing provide yourself with a well-laid cotton line, which is not liable to kink. The line should be seven-sixteenths of an inch in circumference for the big fish one catches in spring and fall, and the hooks should be strong. It is well to carry with you several varieties of squid. For smaller blue-fish a lighter, cotton-braided line is good. When I go blue-fishing I take rubber finger-stalls along to prevent my fingers being chafed by the line. My readers

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should do the same. Horse-mackerel and Spanish mackerel are often taken with a blue-fish line.

For navigating purposes all that is really necessary for a coasting voyage is a chart of the waters you propose to sail in, a pair of dividers and parallel rulers, and a book of sailing directions. A patent log may be added if so desired, and will add to the accuracy of your dead reckoning.

Thus equipped, the navigator may boldly venture forth either by himself or with a congenial companion. If he does not enjoy every moment of his cruise, and gain health and strength from the tonic sea breezes, he can safely conclude that Nature never intended him for a sailor. In that case, he should dispose of his craft at once and seek such consolation as agricultural pursuits afford.

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VI.

KEEP YOUR WEATHER EYE OPEN.

THE sailer of a boat, little or big, should keep his weather eye open all the time. When sailing in a river where the banks are of irregular height he should be especially on his guard, because puffs of considerable violence frequently come with little or no warning. A few inches of sheet eased off, and a gentle luff not quite sufficient to spill the sail, will generally prevent the shipping of water over the lee gunwale, and a possible capsize. Thus the mainsheet should never be made fast permanently, and should always be coiled so as to be clear for running. A neglect of either of these precautions has often been attended with fatal results. If by any mischance the mainsheet becomes jammed do not hesitate, but cut it. A sharp knife in such an emergency has often saved life when an upset has seemed inevitable through the boat being nearly on her beam ends. If you are sailing in a jib and mainsail craft, and the squall has a good deal of weight in it, let fly the jib sheet and let the boat come up in the wind, at the same time lowering away the mainsail and taking care to spill it as it comes down.

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A reef should then be taken in, and the boat be filled away on her course.

While sailing anywhere in the vicinity of New York, and when one of those heavy thunder-squalls that are so frequent in the summer time is seen rising in the northwest, waste no time. If not in too deep water, anchor at once and stow your sails snugly. You can then ride out the fury of the squall in perfect safety; that is, if your ground tackle is sufficiently strong. If your cable parts and you are on a lee shore and there is a harbor to run for, scud for it under bare poles or with a fragment of sail set. If there is no refuge under your lee, set as much sail as your boat can safely carry and thresh her off shore. The chances are that you will be successful, because these squalls while often very dangerous seldom last long, and are generally followed by a flat calm which is more exasperating than a blow.

We will take it for granted, however, that your anchor and chain are of the correct strength and quality, and that you bring up before the squall strikes you. If you have time it would be well to close-reef your mainsail before furling it, and then you would be prepared for any emergency. But let me impress upon all who are in charge of boats with women and children aboard, that it is their duty, when one of those peril-fraught thunder-squalls is seen approaching, to dowse every stitch of sail at once and let go the anchor. There is a wide gulf between bravado and

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bravery, and no truly courageous man would imperil the lives of anyone, especially of helpless women and children. The rash carrying on of canvas has been responsible for more loss of life on the water than any other cause. It is a seaman who shortens sail in time, but a lubber who "cracks on till all's blue."

Great caution is necessary when passing under the lee of a vessel at anchor or under way, especially in a fresh breeze. Your boat is sure to get becalmed and may possibly nearly lose her way, so that as she draws clear of the object the full force of the breeze will strike her when she has scarcely steerage way on. The result may be a complete knockdown or even a capsize. Therefore have your mainsheet clear for running, and do not hesitate to let it fly in a hurry before your little vessel's gunwale is anywhere near the water. By all means endeavor to keep clear of vessels at anchor. Do not try to get in the wash of steamboats, as some foolhardy persons do, "just for fun." On the contrary take special pains to avoid them. When you must encounter their wash, which in the case of large and fast steamers is heavy and dangerous, do your best to let your boat take the brunt of the waves on the bluff of the bow. If they strike her broadside on, swamping is a possibility not far remote.

In sailing a boat in rough water the greatest precaution is necessary. A

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craft that in smooth water could safely carry all sail, might when the sea is perturbed be forced to stagger along under double reefs, the force of the wind being the same in both instances. Especially is this the case when the wind and sea are both abeam, the former strong and the latter heavy. This is probably the most dangerous point of sailing there is, and requires the most careful touch of the tiller. A boat heeled over to fifteen degrees by the force of the wind, by the joint influence of a sudden puff and a heavy roll to leeward may be inclined to such an angle that a capsize is inevitable. When there seems to be any danger of this mishap occurring the helmsman must not close his eyes to keep them warm. When he sees a larger wave than usual coming along he should put his helm up a little, so that it may strike the boat abaft the beam and so reduce the danger to a minimum. The judicious application of weather helm in a beam sea has saved many a big ship's deck from being swept, and many a small boat from being capsized.

It is in my judgment rash to sail a small boat under these conditions unless it is imperative, such as when a harbor is being entered, or when the boat's course must necessarily be steered with wind and sea abeam. I should strongly advise the hauling of the boat on a wind until she reaches the point where her sheets may be eased off and she can be headed for her destination with wind and sea on the quarter. A boat with

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any pretensions at all can be sailed close-hauled in rough water with safety if certain elementary precautions are observed. Everybody on board except the helmsman should sit amidships in the bottom of the boat, so as to keep the weight as low as possible and the craft herself in her natural trim. No unusual weight is wanted in the bow of the vessel, which should lift in a prompt and lively manner to each sea. In an open boat and a nasty sea no more sail should be carried than will keep her under proper command.

A great deal depends upon the nerve and skill of the man at the tiller. Keep her moving all the time. If a big wave threatens to come aboard over the weather bow, luff smartly into it and meet it as nearly end on as possible. Then up with the helm at once and fill on her again, repeating the process as often as it may be needful. Never let the lee gunwale get under water in a seaway, nor at any other time, but always luff before it is too late, and help her to come up in the wind if necessary by easing away the jib sheet.

If the wind keeps increasing and the sea rising, haul down the headsail and pass a gasket round it, close-reef your mainsail, previously seeing your sea anchor clear for letting go. If you have no sea anchor with you, rig some sort of a raft with oars, boathook and sails, the latter lashed securely to the spars. Make a line fast to this raft and pay out about twenty fathoms and let the boat ride to

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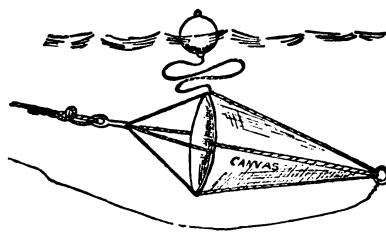
it as to an anchor. It is surprising what a good effect this contrivance has in breaking the waves and keeping the boat head to sea. Nothing else can now be done until the gale moderates sufficiently for sail to be made and the boat headed for her destination. It may be consolatory to those aboard a craft in such a contingency to buoy themselves up by remembering that some of the heaviest gales known have been safely ridden out in cockleshell boats without any damage to crew, hull or gear.



DROGUE, OR SEA ANCHOR.

The sea anchor consists of a hinge-jointed galvanized ring about three feet in diameter. A conical bag made of stout canvas is sewed to the ring and roped, as shown in sketch. A bridle is fitted to the ring, to which the riding hawser is bent. A cork buoy prevents the anchor from diving. When thrown overboard the mouth of the anchor opens and fills. To hoist the anchor on board, the tripping line, shown in diagram, is hauled on. When not in use the ring is

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folded together by the joints, and the bag is made fast snugly round it.

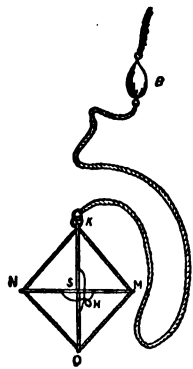

DIAGRAM OF FLOATING ANCHOR.

Another plan for making a floating anchor is shown below. K, M, N, O, are the ends of two iron bars formed into a cross and connected by a stout bolt, nut and pin at their intersection, S. At each end of the bars is an eye through which a strong rope is rove, hauled taut, and well secured. Thus a square is formed, and over the square a piece of strong canvas is laced to the roping. Four ropes are made fast to the iron bars, forming a bridle. To this the riding hawser is made fast. To prevent the anchor from sinking, a buoy, B, is made fast to one corner by a rope, with five or six fathoms of drift. The buoy rope, P, leads on board. H is the hawser to which the boat is riding, A is the anchor, and B the buoy. To get the anchor aboard haul in on the line, P. This will cause the anchor to cant edgewise, and it can then be easily hauled in.

In scudding before a strong wind and a heavy sea in a small craft, a trysail is always preferable to a sail with a boom, which may effect much mischief by trailing in the water or suddenly gybing. The helmsman must be always on the alert to prevent the boat from "broach-

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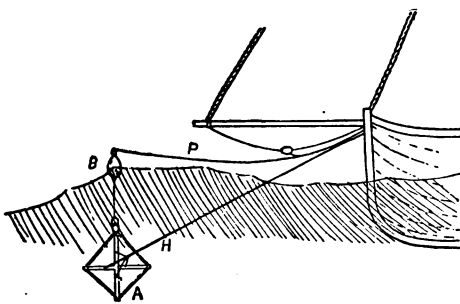
ing to," which means flying up in the wind; or from being "brought by the lee," which means running off so as to bring the wind on the other quarter. A long, narrow boat will always run before the wind better than a short, beamy craft, as she is better adapted for taking the seas, and she also steers easier, not yawing about so much or turning round every few minutes to take a look at her wake. The inexperienced boat sailer should bear in mind that scudding in a



FLOATING ANCHOR IN USE.

seaway is ticklish work, and is not unlikely to be attended with peril. If you have no trysail, reef the mainsail and lower the peak. Hoist on the weather topping, lift so as to keep the boom as high as possible out of the water. By no means run a boat before the wind until it blows too hard and the sea is too high to heave to with safety. If the breeze seems likely to pipe up, make up your mind immediately. Delay is dangerous. Have your sea anchor ready. Watch

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for a smooth. When it comes put your helm down smartly, trimming in the mainsheet. When she gets the wind on the bow, heave your sea anchor overboard and ride to it either with the mainsail set or lowered, as may be deemed best.

If you happen to be on a lee shore, with the surf breaking high on the beach, and you cannot claw off, do not wait until it is too late and your boat is in the breakers. Let go the anchor, and if it holds try to ride out the storm. If your ground tackle gives way, do your best to set the mainsail and steer boldly for the shore. The faster you go the better chance you have to be carried high and dry. Remember that this will give you a fighting chance for your life, whereas if your boat gets broadside on in the breakers she will most likely roll over and over and in all probability drown you and your crew.

It may be thought preposterous for me to advocate the use of oil to break the force of curling wave-crests when a small craft is riding to a raft or sea anchor. Most people would naturally suppose that a boat could not carry enough oil aboard her for it to have any beneficial effect in smoothing a turbulent sea. Nor could it if it was poured into the ocean out of its original package, or out of "bags with small holes punctured in their bottoms," as some marine experts advise. The proper way to apply oil is to fill a round bottomed canvas bag, about two feet long and eight inches in

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diameter, three parts full of oakum or cotton waste. Do not pack too tightly. Pour into this as much fish or animal oil as the oakum or waste will suck up. Sew the mouth up tightly with palm and needle. Secure a lanyard to it. Make a few holes in its sides with a marlinespike and hang it over the lee bow, and you will be surprised at the result. The seas, instead of breaking over the boat and threatening to swamp her, will become comparatively smooth as soon as they approach the limits of the film of the oil as it oozes slowly out of the bag. When running over a harbor bar where the sea is breaking badly, a couple of these bags suspended from either bow will prevent the waves from pooping the little craft and help her materially in her struggle for existence. Mineral oil will do if no other is available, and a gallon of it will go a long way if used in the manner mentioned above. These bags should be carried all ready for use when cruising, so that all you will have to do is to pour the oil in, sew up the mouths and hang them over the bows by the lanyards. A ship's boat with a dozen men aboard once safely weathered an Atlantic gale by riding to a couple of buckets and a cork fender saturated with kerosene. Pouring oil on troubled waters is by no means a case of bluff or the dream of an opium smoker, but a capital "wrinkle" by means of which many a good man has been saved from Davy Jones' yawning locker. I trust

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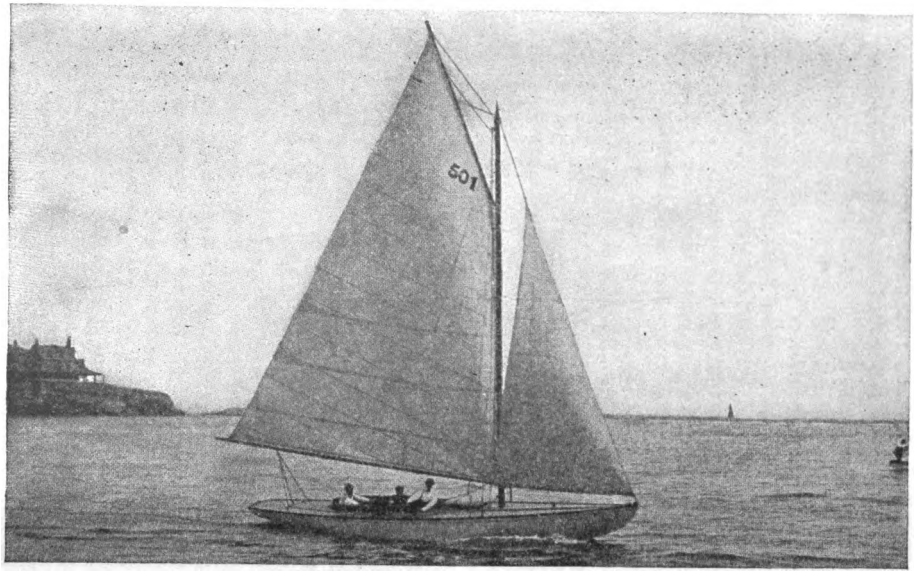

THE BOSTON KNOCKABOUT "GOSLING."

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that these little bags will form part of the outfit of all going on long cruises. They may serve as pillows or may be made in the shape of cushions, so long as the above general idea is followed.

As a striking instance of the value of oil in a heavy gale I will quote the case of the British ship *Slivemore,* which took fire in June, 1885, while in the Indian Ocean about eight hundred miles northeastward of the Seychelle Islands. The ship was abandoned and the boats steered for the islands. Capt. Conly, of the *Slivemore,* gave orders that each boat should take aboard two cans of paint oil for use in bad weather, and he also instructed the officer in command of each boat in the use of the oil. Three days after the ship was left the boats encountered a cyclone. Drags made from spars, oars and sails lashed together were rigged, and to these improvised sea anchors the frail craft rode securely. Stockings filled with oakum saturated with oil were hung over the bows of the boats and formed an oil-slick of considerable expanse. Before the stockings were hung out the boats narrowly escaped being swamped and the men had to bail hard with buckets. The oil prevented the seas from breaking and the boats rode over the enormous waves in safety. Little water was shipped, and those on board the boats were able to lie down and sleep while a tropical cyclone was raging furiously. All the boats reached the islands in safety without the loss of a man, but had it not been

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for the oil the loss of the *Slivemore* would have remained an untold mystery of the ocean.

A still more wonderful example of the efficacy of oil is told by the captain of the ship *Martha Cobb*, and it relates to the achievement of a sixteen-foot dinghy. In December, 1886, the *Martha Cobb*, petroleum laden, encountered a heavy gale in the North Atlantic. She shipped some tremendous seas which swept away all her large boats, washed away her bulwarks and played havoc generally with her decks. The only boat that was left uninjured was the aforesaid sixteen-foot dinghy, intended solely for smooth water work.

While laboring and plunging in the mountainous sea, the *Martha Cobb* fell in with a sinking vessel flying signals of distress to the effect that the water was fast gaining on her and that all her boats were stove in. The captain of the *Martha Cobb* determined to stand by the vessel in distress, in the hope that the gale would abate. He knew that his little cockleshell of a dinghy could not possibly live in such weather, and that it would be suicidal to lower her and attempt a rescue.

After standing by till near nightfall with no prospect of the storm moderating, the commander of the *Martha Cobb* determined to make an effort to save the crew of the fast foundering craft. The *Martha Cobb's* petroleum was in casks, some of which leaked. The captain had noticed that when the pumps were being

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worked the sea in the wake of his ship was always much smoother. He got the *Martha Cobb* to windward of the wreck and started the pumps, in the hope that the oil in the well and bilges would create a smooth when it reached the sea, so that the dinghy could be lowered in safety.

He found, however, that the ships drifted faster than the oil, so that while the sea to windward was comparatively smooth the water to leeward was rough as ever. So he kept his ship away, ran down under the vessel's stern and luffed up under her lee. Then he started the pumps and also allowed a five-gallon can of fish oil to trickle into the water through the scuppers. The effect was almost miraculous. In less than half-an-hour the crested surges and breaking combers were converted into long heavy swells such as you see when a calm has succeeded a heavy gale.

The little dinghy was lowered, and manned by three men, was pulled to windward alongside the wreck with little difficulty. All hands were rescued, and the tiny boat, while engaged in the gallant work, shipped no water. All this time the waves were breaking furiously outside the magic limit of the oil-slick.

One more illustration and I am done. Capt. Amlot, of the steamer *Barrowmore,* on January twenty-fourth, 1885, while in 51 degrees north latitude and 21 degrees west longitude, fell in with the sinking ship *Kirkwood.* This ship had for part of her cargo several hundred casks of

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canned salmon. In order to make a smooth and allow the boat of the *Barrowmore* to come alongside in safety, the crew of the *Kirkwood* broached a number of the cases, and opening the cans poured the oil from them into the sea. This had the desired result, and although the sea was very heavy the oil reduced it rapidly, and the boat of the *Barrowmore* had no difficulty in taking off the twenty-six men that composed the ship's company of the *Kirkwood*.

Two quarts of oil used per hour will produce effective results. A ship scudding before the wind, with a mountainous sea running and threatening to poop her, has expended this amount and kept dry. Experts have calculated that this quantity of oil has covered the sea with an infinitesimal film measuring thirty feet in width and ten nautical miles in length. As the thickness of this film is only .0000047 of an inch, its efficacy is indeed marvelous.

A simple and excellent device for distributing oil has been invented by Capt. Townsend, of the United States Signal Office. It is cheap and convenient, and is especially adapted for use in boats or small yachts. It has been thus described:

"It consists of a hollow metal globe ten inches in diameter, with a capacity of about one and a-half gallons of oil. It has an air chamber separated by a partition to keep it afloat in a certain position, and there are two valves. When filled with oil the upper valve is adjusted to allow oil to flow out at any desired

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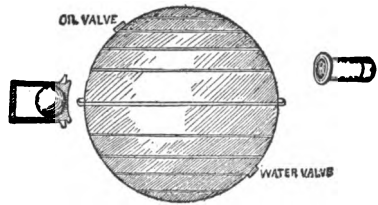
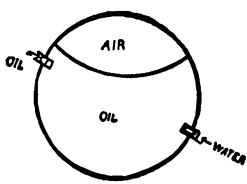
rate, while the lower valve admits water. When placed in the sea it floats with the upper valve a little above the surface, and water will enter to displace the oil from the graduated upper valve.



The specific gravity of oil will keep it in the upper part of the distributor, and the motion of the globe on the breaking waves or swell will insure the ejection of the oil through the graduated valve in any quantity."

This may be used by towing over the bow when running, or made fast to a sea anchor when hove to.

People inclined to be skeptical are, of course, at liberty to doubt the efficacy of oil to lessen the dangerous effect of heavy seas, but the examples I have quoted are simply a few culled from several hundred well authenticated cases.



PLAN OF OIL DISTRIBUTOR.

The lesson learned from the Shipwash lightship some twenty years ago, has not been without profit and benefit to naval architects. Let me spin you the

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yarn. The Shipwash lightship is moored in one of the most exposed places on the east coast of England, and is thus continually encountering particularly heavy seas. About twenty years ago the old lightship was replaced by a new and scientific vessel. The new-fangled craft was, however, so remarkably unsteady and rolled so heavily that to the storm-tossed mariner beating up the coast her light appeared to be of crescent shape. Her crew got scared. They were afraid she would turn turtle. A surveyor from the Trinity House was sent aboard, and he made a report which was submitted to her designer, who eventually said the fault complained of could be easily remedied by the addition of extra ballast. Accordingly this was done, and the next gale she rode out her rolling was worse than ever, and produced quite a panic among her crew, who were afraid to go below while the storm lasted. Another report was made to headquarters. Other students of naval architecture were consulted, who not only advised that the extra ballast be taken out, but that four tons of lead be attached to the frame or cage supporting the light. These instructions were carried out, and the result was the steadiest lightship on the east coast.

A vessel will carry herself full of coal and behave herself in heavy weather. But when she comes to be laden with copper ore or lead, a certain amount of ingenuity has to be used in the storage of such heavy cargo to make her sea-

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worthy at all. If it were all stowed in the bottom of the vessel she would roll so heavily in a seaway as to get dismasted, and would probably become a total wreck. It is now that the experienced art of the stevedore comes in. The man who follows the proper authorities would construct a bin or compartment in which to stow this dangerous freight thus:

The result would be highly satisfactory. The vessel's center of gravity would be the same as though she were laden with coal, and her movements in a seaway would therefore be quite as easy.

Another man might construct his compartment thus:

The vessel in this case would labor quite heavily on the slightest provocation and would not be so steady or so seaworthy as the one first mentioned, with the narrow bin or compartment extending to the upper deck.

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The same remarks apply to the ballasting of yachts. Before the days of outside lead, when pleasure craft shifted their racing for a cruising rig preparatory to a deep-water voyage, it was customary to raise the inside lead ballast by placing layers of cork beneath it, thus ensuring easy movements in a seaway. Racing yachts nowadays have all their weight outside, and this device for their relief cannot therefore be resorted to. When crossing the Atlantic, say for a race for the *America's* Cup, they are always in danger of getting caught in a gale of wind and an accompanying mountainous sea. In order to prevent excessive rolling, which might endanger the mast and consequently the vessel herself, it is necessary to keep a press of sail set. For this purpose a trysail with plenty of hoist to it is indispensable. It should not be one of those jib-headed impostors that some racing skippers most unaccountably affect, but one with a good long gaff that will successfully prevent the otherwise inevitable and peril-fraught roll to windward.

A yacht under these circumstances, it is true, cannot carry a great press of canvas when on the top of one of those big rollers that a gale soon kicks up in the Atlantic. But she wants as much of her sail area as possible exposed to the gale when she is in the hollow of the wave. Otherwise there will not be sufficient pressure to prevent her from rolling to windward.

Rolling to windward—easy enough to

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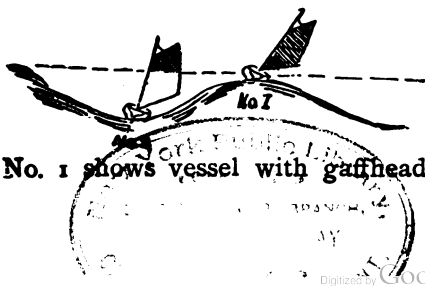
write, you may think—but every sailor knows what may follow. Green seas fore and aft, mast sprung, men washed overboard; and if the gale does not abate, why, Davy Jones' locker for all hands and the cook!

The storm trysail must necessarily be a sheet-footed sail set over the furled mainsail. It is a sail comparatively narrow at the foot, but it should for obvious reasons be made as broad as possible at the head, in proper proportion of course to the breadth of the foot. It need not have quite as much hoist as the mainsail, for the throat halyards at such a time must have a good drift, while to keep the sail inboard the peak should be quite extreme. It follows, therefore, that although the rollers may be high the peak of the trysail is above them, and the yacht is kept jogging along steadily without any sudden and violent shocks or strains to spar or rigging.

The following rough sketches will, I think, serve to demonstrate the superiority of the gaff-headed trysail over that abortion, the thimble-headed variety, which I do not hesitate to condemn as useless for a modern yacht ballasted with outside lead in a seaway.



No. 1 shows vessel with gaff-headed

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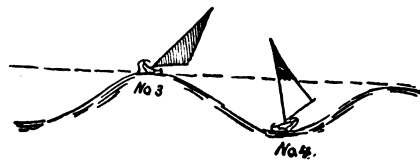
sail on the crest of a wave. She drops down into the hollow of the wave and becomes No. 2. The shaded part of the sail catches the wind over the crests of the waves, and the area so exposed is sufficient to steady the vessel and give her a safe heel or list.



Now I wish to call your attention to No. 3. She has enough sail spread when on the crest of a wave. But observe her when in the hollow. She has scarcely a stitch of sail above the level of the crest. The consequence is that her weight being so low down, and her form having so much stability, she swings with a violent roll to windward and her mast is thereby imperilled. This is the result of not having the requisite amount of pressure at the head of the sail.

The commanders of square-rigged vessels always bear this in mind. They heave to under a close-reefed maintop-sail, never under a lower course, and the ship when in the trough of the sea has enough sail exposed to keep her steady. The smart schooners that used to ply between St. Michaels and London in the fruit trade, and that were bound to make smart passages or lose money, were always fitted with gaffheaded trysails, and found them most efficacious in beat-

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ing to windward in strong gales. Their sturdy skippers would have looked with contempt and ridicule upon any person so fatuous as to recommend a jibheaded trysail. And they were skilled sailors of fore-and-aft rigged craft, and were well acquainted with that stretch of the wild Atlantic between the Lizard and the Azores. These vessels used to beat up the English Channel in the teeth of an easterly gale and fight their way homeward inch by inch, and I consider the practical experience of their captains as far more reliable than the theoretical vagaries of men who were never out of soundings in a small craft.

What is true of comparatively large yachts in an Atlantic gale applies equally to the small cruiser. The theory is precisely the same, and in ordering a storm trysail from his sailmaker the aspiring owner of a smart, seaworthy cruiser might well be guided by the few hints given above. A gaffheaded trysail is just what he wants to steady his boat when hove to, and to counteract that tendency toward rolling that outside lead always has on the hull of a boat in a seaway.

When coming to anchor at any other time than low water, do not forget to allow for the fall of the tide. For instance, if you bring up in 10 feet of water when the tide is high, in a boat drawing, say 5 feet, and the range of rise and fall is also 5 feet, at low water your vessel would be aground and perhaps under untoward circumstances in danger

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of damage or even total loss. This hint is worth remembering in many parts of the world, especially in some parts of the Bay of Fundy, where there is a range of no less than 50 feet! Soundings on the chart denote the depth at mean low water.

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VII.

OVERHAULING THE YACHT.

NO matter how small a craft the yachtsman owns she will, after a winter's lay-up, require a good deal of attention before she is fit for the water; and there is no reason why a keen yachtsman who owns a tidy little craft should not fit her out himself in his spare time. In fact, I am acquainted with many boat-owners who find nearly as much delight in getting their own vessels into proper fettle for the season's sport as they do in navigating them. There is much to be said in favor of this enterprise. The principal argument is that a man overhauling the hull of the boat which belongs to him will not be at all likely to "scamp" the work. On the contrary, it is to his interest to do the job thoroughly while he is about it, for he is improving his own property; whereas if he employs a mechanic to do it by piece work, or by the day, the task may be performed in a manner more or less perfunctory, or at any rate without the attention to minor details which the actual proprietor would be expected to bring to the task.

I would not counsel a man to attempt repairs which call for the skilled shipwright or boat-builder. The result would in all probability be a lamentable

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failure, and in the end a mechanic would have to be called in. But the work of cleaning, painting and varnishing a hull intrinsically sound may be accomplished by the man or boy of average intelligence and industry.

What is true about a hull is still more so of her rig. When I first went to sea on a deep-water voyage, as soon as the ship was out of soundings the crew's first duty was to undo the work of the professional rigger, stay the masts anew by shrouds and backstays, and replace the hurried botch-work of knots and splices by seamanlike and shipshape work.

Anything in the shape of a boat may be made water-tight, no matter how leaky she may be, if treated with careful ingenuity. I would be the last man to suggest patching and puttying up a ramshackle craft whose frames and planking are rotten. Supposing, however, that the hull is fairly sound, but through exposure to the hot sun her planks are cracked in sundry places, and that in fact she leaks like a sieve, there is no reason why she should be condemned. There is a lot of good fun to be got out of a craft of this kind, if the proper repairs are made. If put in the hands of a professional boat-builder the cost would be very high, even if he could be induced to undertake the work. Here, then, is where a handy man or boy has a capital opportunity to try his hand as a craftsman. I repaired an old 18-foot boat in my younger days, when

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money was scarce and I had the alternative of giving up my pet diversion of sailing or making the ancient bucket tight.

This is how I went about it.

The craft in question was hauled out on the shore above high-water mark. She had been abandoned by her rightful owner, who had moved inland and left her to the tender mercies of the sun in summer and the snow in winter. For sixteen months she lay on the beach neglected. Every day I cast covetous eyes on her. I will make a clean breast of it now in my old age and confess that I had contemplated stealing her. That sin was, however, spared me, as I found her owner's address and wrote, asking if he would sell her. He replied that he would give her to me and welcome, and thus made me the happiest youth in the land.

The boat was originally a first-class little lap-streaker of good model, built of teak throughout and copper-fastened; but there were many cracks in her planks and most of her fastenings were loose, and in a general way she might be described as "nail-sick" all over. With the help of a couple of chums I placed her on chocks and shored her up on an even keel, supporting her well, so that she should not suffer from any unequal strain when I filled her later on with water. She was very dirty inside, and I remember it took me the greater part of a day to thoroughly clean her with soap, hot water and a scrubbing

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brush. Then I put the plug in and started to fill her up with water. Although I had plenty of help from the village boys, who were never so joyous as when pottering about a boat, it took a long time to fill her, for the water poured out of her like the streams from a shower-bath. But her dry and thirsty planks soon began to swell a little and the leaks to diminish. I kept her as full of water as possible for two or three days, marking with chalk every leak that appeared. I may remark that the chocks on which her keel was raised were high enough for me to crawl completely under her bottom and get at every part of her. Her hull, which originally had been varnished to show the grain of the natural wood, was pretty well checkered with chalk-marks by the time I had finished. Then I let the water drain out of her, and waited until she was dried thoroughly by wind and sun.

Meanwhile I bought a lot of copper nails of the requisite length and rooves to match, with the use of which I had become thoroughly familiar from watching the men in the boat-shop hard by.

Then I began operations, aided by an apprentice from the boat-builder's establishment whom I induced, by the proffer of pocket money, to turn out of his bed at dawn and lend me a hand till the clang of the bell summoned him to his daily toil. We replaced all the rivets that had worked very loose with new ones

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of a larger size, and drove an additional nail between every two originally driven. The old nails, which were only a little slack, I hardened with a few taps of the hammer from the inside, while Toby, the afore-mentioned apprentice, "held on" against the heads of the nails with another hammer on the outside. This was slow and tedious work, but it paid in the long run, for it made the boat almost as good as new, her frames, as I have already mentioned, being in capital condition.

My next operation was to borrow a pitch-kettle from the boat shop and to put in it a pound of pitch and a gallon of North Carolina tar. Kindling a fire under it I let it boil until the pitch had melted, stirring it constantly. This mixture I applied boiling hot to the inside of the boat with a paint-brush, filling every crevice and ledge up to the level of the underside of the thwarts. It was astonishing what a quantity of this composition the planks absorbed. I put only half a ladleful of the tar into my paint-pot at a time, so that it should not stand long enough to cool, replenishing every few minutes from the boiling kettle. Tar when at the boiling point is comparatively thin, and has superior penetrative qualities, so it can be worked with the point of the brush into every crevice, no matter how minute. When it hardens it forms a water-tight seam which possesses, from the nature of its ingredients, a certain amount of elasticity.

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There were a number of sun-cracks in the planking, which I filled with fish glue, run in hot from the outside. This composition dries very hard and does not crack. My next task was to sand-paper the outside, smoothing the very rough places with pumice-stone after wetting them well. I ached all over by the time this process was completed but I got her as smooth as glass. Then I gave her outside a couple of good coats of raw linseed oil applied on a hot day. As a finish, not caring to waste money on varnish, I gave her a final coat of boiled linseed oil, in which a generous lump of rosin had been melted. This is the mixture used from time immemorial by the Dutch on the bottoms and topsides of their galliots, and it wears well and looks well, resisting the action of both fresh and salt water. I may say that this method of making my boat water-tight was economical and successful. The example may be followed with similar results by anybody who owns a leaky lapstreak craft.

Another method, as practiced on a St. Lawrence skiff that was badly checked and rotten in places, is thus described by a veteran boatman who made the successful experiment: "The boat was of lapstreak construction, and many of the seams had opened. I went entirely over the boat, first closing the seams as much as possible by drawing together with clout-nails. Next, where there were cracks through the 3 16-inch planking, I cleaned the painted surface, and

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where the paint had blistered I removed all of it by scraping. When the surface was in proper condition I cut a strip of eight-ounce duck of a length and width to cover the crack (generally ¾ inch was wide enough) and smeared one side, by means of a stick, with liquid glue. The canvas was applied to the crack and pressed down, and the glue-stick drawn over the raveled ends from the center outward, to make them adhere closely to the boat. Then the canvas and surrounding wood were brushed over with enamel paint. The painting must be done before the glue sets, as otherwise the canvas is apt to warp. Open cracks ⅛ inch wide were covered in this manner, and also cracks at the butts of the strakes. After all of the cracks were treated I gave the boat two good coats of paint over all, and the result was a comparatively smooth surface, and one that was absolutely watertight." The veteran very truly adds that an old boat repaired in this way will not stand any rough usage, and the patches are not proof against being dragged over rocks, or even a sand-beach; but by a little labor a boat that is practically worthless may be so made serviceable for an indefinite time.

By either of the methods mentioned above a lapstreak boat may be made tight as a bottle. A carvel-built craft—that is, one with the planks flush, edge and edge, and the seams between calked and payed—may generally be made tight by recalking her with threads

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of cotton prepared for that purpose and sold by ship-chandlers, driving the cotton well home with iron and mallet, and afterward puttying up the seams. Care should be taken, however, not to put the cotton in too tight, or drive it right through the seam. Serious damage has often been done to a boat in the way of increasing her leakiness by too hard calking. Or the boat's hull may be completely covered with light duck nailed on with copper tacks, and afterward well painted. This, however, is rather difficult for a greenhorn to accomplish so as to make a neat fit of it; but I have seen several boats repaired and renovated in this manner by young men gifted with ingenuity, and a great deal of patience. I may say that the result, if the work is well done, is worth the pains thereon expended.

Rowboats, sailboats, and launches propelled by any kind of power may have their hulls treated after one of these fashions, with quite satisfactory results.

If the owner does not think he is sufficiently handy to undertake the stopping of leaks he can, at any rate, paint and varnish his craft. To paint a boat outside or inside a perfectly smooth surface is necessary, and to obtain this all rough spots should be smoothed with pumice-stone and sand-paper. Enamel paint should be used above the water-line, and the bottom may be painted with any one of the excellent compositions now in the market, which prevent

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grass and barnacles from flourishing too luxuriantly on the underbodies of boats.

The interior of the boat, after being thoroughly washed and scrubbed, should also have a coat or even two coats of enamel paint, as this composition is lasting and wears three times as long as the ordinary preparation of white lead, oil, turpentine, and pigment. One thing, however, is worth remembering. Never use washing soda or boiling water to clean wood covered with enamel paint. Rub it with a sponge or flannel cloth dipped in lukewarm water and a little soap. For protecting and beautifying natural wood above deck or below, use a good brand of spar varnish. This will resist the damp, salt air of the ocean, or the more penetrating moisture of fresh-water lakes and rivers, far better than the higher grade of varnish used for the indoor decoration of dwelling houses, which, when it gets damp, acquires a plum-like bloom on its surface by no means beautiful.

Mr. W. Baden-Powell, than whom there is no better authority, says very truly, that there is no more dangerous time in their lives for the spars of canoes than when stowed away in a boat-house roof for the damp winter's rest. Bamboo spars are more liable to suffer than pine, or solid spruce, but each and all are in danger of splitting or kinking, especially so in the case of built spars, if glued up, instead of screw-built. With such convenient lengths as are found in canoe spars, there is no

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excuse for leaving them in damp boat-houses, as they can be stacked in a room corner, on end, and the sails and rigging in drawers or boxes. In this way each item of rigging can be overhauled, mended, improved, and set in order for the coming year, just as convenient spare time offers.

About the middle of March in these latitudes we generally are blessed with ideal sailing breezes, a trifle blustering and boisterous, perhaps, when the merry music of the stiff nor'wester pipes through the rigging, but nevertheless vastly enjoyable to the ardent amateur, who grasps the tiller of his stanch shippie and fearlessly luffs up to the strident puffs, knowing that he has a stout hull beneath him, and that sails and gear are of trusty strength.

It is all very well for the steam-yachtsmen and such-like marine Sybarites to wait for the hot days of July to arrive before ordering their floating palaces to go into commission, but he who depends upon sails can ill afford to allow all the glorious winds of the fresh and fragrant springtime to blow themselves to waste in such reckless, feckless fashion. There may be a chilly sting or bite in the spray that breaks on the weather bow in a silver shower and smites the helmsman mercilessly in the face, but there is invigorating ozone in wind and water, and a glow of triumph after a successful battle with breeze and billow.

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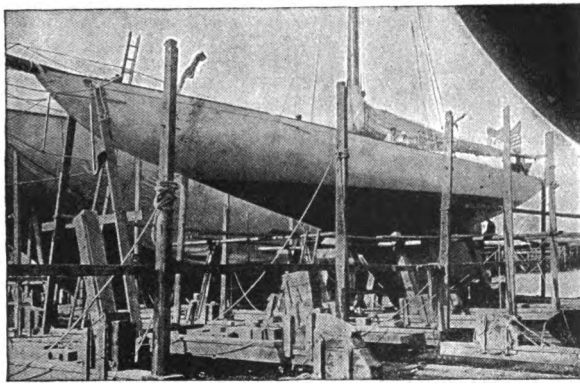

IN DRY DOCK.

Photo by Dr. Titus.

HAULED OUT FOR PAINTING.

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It is prudent, too, to fit out early and lay up late, for life, alas! is brief, and it behooves us, my boating brethren, to enjoy as many brave sailing days as possible ere we make our final voyage across the Styx, with grim Charon, the ferryman, taking his perennial trick at the tiller, while his pets, the frogs, plash and play and croak in his muddy wake.

If the yacht is a small one—a knock-about or a 30-footer—and she has wintered afloat, the first thing is to haul her out and prepare to clean her hull of barnacles and grass, of which a goodly crop is sure to have grown on her below the water-line. Start in with scrubbing brushes, sand and canvas and use plenty of elbow grease until she is thoroughly cleaned and all rough places smoothed with pumice stone. Use plenty of fresh water, with a flannel cloth as a final application to her hull. Then leave her until she is thoroughly dry. Carefully examine her seams for leaks, calking where necessary.

When your boat is out of water open her wide to the fresh air. Rig up a windsail, and let the healthful breezes circulate through her interior. If she has hatches or skylights, lift them off; if portholes, unscrew them and give the wind a chance to blow all close impurities away. Rig the pump and relieve her of all malodorous bilge water, the most nauseating and offensive evil that is met with by mariners. Take up the cabin flooring. If the ballast consists of

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pig iron, rout it out, clean off the rust, and before replacing give it a good coat of coal tar, applied hot. Clean the limbers and flush them with plenty of water, using a bristly broom to remove the dirt. Splash the water about lavishly, and then pump it out dry. If there happens to be a cooking stove below, as there generally is in a vessel of any size, light a roaring fire and do your best to kill all fungoid germs or spores that may have gathered in damp places during the winter. Examine the ceiling for leaks.

Should, through imprudent oversight, any bedding, matting, carpet, or clothing, have been left in the boat since last season, take them out and have them cleansed and dried. If mold and mildew have attacked them, destroy without compunction, and resolve to take better care next time.

After thoroughly cleansing the craft inside from the eyes of her to right aft with soap and hot water, you can paint her cabin, if you deem she needs it, using enamel paint if you are willing to go to a little extra expense, or, at any rate, if not, using a generous quantity of spar varnish with the oil and dryers you mix your white lead with. This dries good and hard and is easily cleansed with warm water, soap and a sponge, and is far more durable and satisfactory than paint mixed in the ordinary manner. Two coats should be given.

The next process is to clean the deck

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of the coat of varnish with which it was doubtless covered when the yacht was prepared for the winter. To accomplish this in the most efficacious manner, procure from a ship chandler a sufficient quantity of one of the many preparations of caustic soda, with which the market is well equipped. Dissolve it in an iron bucket in hot water, mixing it strong enough to act as a powerful detergent. These preparations vary in power, so it will be well to experiment on a section of the deck with a sample and then add more soda or more water as required.

After sundown apply plentifully to the deck with a mop, rubbing the mixture well into the planks. Next morning before sunrise arm yourself with a good hard deck-scrubber, and set to work in earnest, using plenty of hot water and scrubbing the deck planks (fore and aft, mind you, always, and never athwartship) until every particle of the old varnish and every speck and stain is removed. If the detergent is allowed to remain on the deck while the sun is shining, it is bound to eat into the planks and burn them.

The next operation is the painting of the boat inside and out. There are many excellent compositions for coating the hull below the water-line, but if you do not care to experiment with them, use the recipe given in the chapter on "Useful Hints and Recipes." Choose a clear, dry day and apply the paint. For above the water-line use

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pure white lead of the best quality reduced to the proper consistency with equal parts of raw and boiled linseed oil and copal varnish. Add a dash of dryers and a few drops of blue paint, strain and apply.

Personally, I prefer to varnish the deck of a small craft, though I am quite willing to acknowledge the superior beauty of a spotless deck white as a hound's tooth. The friends of a yachtsman often wear boots with ugly nails in them, both on soles and heels, and these are apt to play havoc with the spick and span appearance of a deck innocent of varnish. After cleaning the decks thoroughly let them dry well. Wait for a sunny morning and a northwesterly wind, when the air is comparatively free from moisture. Get your can of spar varnish out, and after sweeping the decks and dusting them thoroughly with a feather-duster, apply with a regular varnish brush of convenient size. It is advisable to pour out the varnish into a shallow jar, a marmalade pot for instance, in small quantities as required, as varnish loses its virtue rapidly by exposure to sun and air. It is expedient, therefore, that the varnish can, or bottle, should never be left uncorked. The varnishing process should not be undertaken until the last thing, after the boat has been cleaned and painted inside and out, spars and blocks scraped and polished, standing rigging set up, running rigging rove and sails bent. Two thin coats of varnish will be ample for the

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decks and spars, as well as all the hardwood fittings and trimmings of the yacht inside and out.

Should the varnish be too thick to flow freely from the brush, *don't* thin it with oil or spirits of turpentine unless you wish to dim its luster and deprive it of much of its preservative quality. Simply place the varnish can in a bucket of hot water, and let it remain there until it gets warm, when you will experience no difficulty in applying it to advantage. Another hint worth taking is never to buy cheap and inferior varnish. The best is none too good.

These suggestions may appear superfluous to a professional yachtsman, who, if he happens to read this yarn, might feel tempted to observe: "Why, every darned chump knows that!" As a matter of fact, amateurs as a rule are not familiar with these little "wrinkles," which are in many cases tricks of the trade. This yarn is spun for amateurs only, and not for the edification or instruction of veteran professionals. About half a century ago, when I first became a boat owner, I should have been delighted to get the fruits of a practical man's ripe experience

Fashionable craft with spoon bows and long overhangs forward have abolished the long bowsprits and simplified the head gear. The short bowsprit is secured with a steel bobstay extending from the stem to the cranze iron on the bowsprit, the bobstay being set up taut with a turnbuckle of galvanized iron.

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The bowsprit shrouds are of steel wire also set up by turnbuckles.

The polemast has also done away with all the topmast gear, the mast being secured by a forestay which sets up to the stem head and by one or sometimes two shrouds on each side set up by turnbuckles. The days of deadeyes and lanyards and of reefing bowsprits are departed. A sailor to be quite down-to-date should combine with his nautical knowledge some of the art of the blacksmith. Strength and lightness and handiness are the watchwords of to-day, and with modern methods the gear of a small craft is so simple that it takes little time to rig her.

I suppose I may take it for granted that all the running rigging was neatly coiled up and labeled and stored ashore when you went out of commission last fall. I know many smart young yachtsmen who while away many a long winter evening with pleasure and profit overhauling sheets and halyards, stropping blocks, varnishing them, splicing, serving and generally repairing all of the running gear that needs attention, making manropes, scraping and polishing the gangway ladder, the tiller, etc., and in other ways preparing for their summer's amusement. The study of navigation, the rule of the road at sea, the coast pilot, the learning of marlinspike seamanship and a rudimentary knowledge of the use of the palm and needle, so that if a sail should need some simple repairs they may be made

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without loss of time and without seeking aid from a sailmaker—all these the amateur will find useful. It is astonishing how much one can learn in one winter if he devotes only an hour a night to the acquirement of nautical lore.

But supposing that his running gear has not been touched since it was unrove, it will take only a short time to get it in tip-top order, and the work may be done in the evening when it is too dark to potter about the yacht.

While you are about it you may as well make a thorough job of this fitting out. Shin up the mast and make a tail-block fast to the masthead as high as possible, reeving a gantline through it so that you may sit in a boatswain's chair or in a bowline while you survey the stick. If the collars of the shrouds or forestay show any sign of chafe, they must come down and be served over again with spun yarn or covered with canvas sewn on with a palm and needle, using plenty of lead colored paint in the process to prevent rust. Examine the masthead carefully for weak parts, which generally are to be found in the wake of the rigging. If rot and signs of serious strains are met with, it is evident that a new mast is needed. Longitudinal cracks may be disregarded unless they are glaringly apparent, but transverse cracks should be viewed with suspicion.

If, after close inspection, you conclude that the mast is good enough to stand, you may as well begin to scrape it,

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engaging your chum to lower you down by your gantline. After scraping, use sandpaper until it is polished smooth. Then give it a couple of coats of spar varnish. If the boat has a bowsprit, treat it in the same way. If she carries a topmast, scrape and varnish it and the boom, gaff, spinnaker-boom, boathook and the oars of your dinghy as well as all blocks ashore, wherever convenient.

Next set up your rigging good and taut, taking care to stay the mast perfectly plumb—no rake aft or forward. If you carry a topmast, send it up and stay it in the usual way. Get your boom in position by means of the gooseneck and the crotch; reeve your topping-lift and hook it on to its place at the end of the boom. Get the gaff in place, hook on the throat and peak halyards, and there you are all ready to bend sails.

It is imperative that your vessel, whether she be a cruiser pure and simple or a racer, should have a well, cut suit of sails. If it is your intention to treat her to the luxury of a brand new suit, I hope that you placed your order with a responsible sailmaker weeks ago. The winter is the correct time to have your sails made, when the knights of the palm and needle are not so apt to be rushed.

Yacht owners have the habit of procrastinating where sails are concerned, and postpone their orders for new canvas to the very last moment. This causes such a hurry in the loft that large orders are apt to receive the first and

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best attention of the sailmaker, while the owner of a moderate-sized vessel has to wait the foreman's convenience; whereas, if an order is placed before, say, Christmas, one of the firm is as likely as not to give the matter his personal attention, measure your craft himself, and let the cut and the sit of the sails have the benefit of his own supervision. It is also a fact that the sailmaking firms make it a point to keep their best men at work all the year round, while the mere ordinary workmen are "laid off" when the season closes. The consequence is that the yachtsman who orders his sails in good time has the advantage of the most skillful craftsmen in the market, and he is likely, too, to have better prices quoted him than in the rush of the season, when all hands are hard at it. Therefore, my advice is to take early action and win the best results at the most favorable figure.

It was always my custom, before unbending my yacht's sails preparatory to going out of commission, to summon my sailmaker aboard and take him for a short trip, pointing out what I considered to be the defects in the muslin and listening to his suggestions for their remedy. He would make notes in his memorandum-book and inscribe certain hieroglyphic marks on the sails themselves. When the canvas was unbent he would send for it, make the repairs and alterations at his leisure and store the sails for me until the spring, when

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I would find them in perfect condition for setting. All this was done for moderate compensation, considering the excellence of the workmanship.

The importance of a well-cut and well-sitting suit of sails cannot be overestimated. No matter how well the naval architect may have executed his work in the design of a vessel's hull, if the sailmaker has failed in his task, success in racing is an impossibility. You might just as well expect a fast homing pigeon to attain his normal speed with a crippled wing as a yacht to win a cup hampered by sails of poor material and faulty construction.

If low-grade material is used, despite the best efforts of the scientific sailmaker, the sails are sure to be unsatisfactory. The climate on the Atlantic coast is peculiarly trying even to the finest grades of cotton duck, which is assuredly the best fabric known that can be used for the purpose of the sailmaker. The hot and arid westerly winds dry out the sails so that they become soft and open, causing them to stretch abnormally and to get full of what are technically termed "hard places." The wind shifts to the eastward, a damp, moist quarter, and the result is a severe shrinking, which, in conjunction with the previous violent stretching, is enough to play havoc with the best and closest woven material, no matter how scientifically designed and constructed. You can imagine how a suit of sails of cheap and common duck,

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botched by some ordinary tentmaker, would be likely to behave under such circumstances.

My advice is to order your sails of a reputable firm of experience, have them made of the best material, and take care that they are bent by a man of judgment and skill and not by some habitué of a hay-mow or a pig-drover fresh from the farm. I have known a suit of sails that cost several hundred dollars irretrievably ruined by being overstretched in the first instance by a sailing-master ignorant of the first principles of his calling.

A well-known sailmaker, who has made sails for some of the crack racing yachts of America, gives the following admirable instructions for setting the sails of a 40-foot single-sticker: Cast off the tyers from the mainsail; hook on the peak halyards; see that the gaff goes up between the topping-lifts as you hoist up on the throat and peak halyards; hoist up on the throat until the luff-rope is straight; if the sail has a slide on the boom, haul out on it till the canvas is just straight and smooth on the foot; too hard a pull will throw a heavy strain on the diagonal, from the end of the boom to the jaws of the gaff, giving a bad after leech when the peak is swayed up; next sway up the luff pretty taut; it is not necessary to top the boom up to too great an angle out of the crotch; man the peak halyards and hoist on them until the after leech is so lifted that it spreads and stretches

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every square inch of the after angle of the sail; as soon as the peak begins to lift the outer end of the boom, the main-sheet should be made fast (unless the boom extends so far over the taffrail that it would bring an undue leverage on the boom and spring it to breaking); now sweat up the peak halyards until the stretch is entirely taken out of the halyard canvas; if the peak is hoisted beyond its proper angle, it puts an undue strain on the diagonal, from the end of the gaff to the center of effort of the sail, the consequence being a nasty gutter just inside the leech, which gives rise to the groundless complaint that there is a tight cloth inside the after leech. It should be remembered that the trouble lies in stretching the head and foot of the sail too taut, and oversetting the peak.

These instructions are so clear as to be intelligible to the merest tyro, and should be followed out on all occasions. A good mainsail costs a large sum, and there is no reason why it should be ruined by neglect of proper precautions.

In setting a thimble-headed topsail hoist away on the halyards, then bowse the tack down with a purchase, then sheet it out to the gaff end so that there shall be an exact and even strain on both foot and leech.

The proper angle of the jib-sheet depends entirely on the position its clew occupies in relation to the stay. It should always hold the foot of the sail

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a little more than it does the after leech, so as to allow the proper flow, which is so effective as well as so beautiful.

If you determine that the craft's old suit is good enough for another year, overhaul it for holes. Perhaps the sails have been stowed away where rats or mice have had free access to them. If so, they will need repairs. If they were rolled up damp, or stored in a damp place, they will probably be badly mildewed. The unsightly stains of mildew can be partially removed by scrubbing the sail on both sides with fresh water and soap, and afterward rubbing whiting over it and leaving it to dry and bleach in the sun.

If the sails are discolored, they may be improved by laying them on a plot of clean sand, scrubbing them on both sides with sea-water and salt-water soap, and afterward sprinkling them with salt-water in which whiting is dissolved until it looks like milk. Let them bleach in the sun until one side is quite dry, and then turn them over.

To prevent mildew from spoiling the sails, keep them dry and well ventilated. If a sail is furled when damp, the inner folds will mildew. Always roll up a wet sail loosely, and shake it out and dry it the first chance you get; in any case open it out and give it air, even if rain continues to fall. Remember that new sails will mildew very quickly because of the "dressing" in the duck, which sets up a fungoid growth or fermentation. For these reasons don't depend

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too much on your watertight sail-covers, but give your canvas frequent air and sun baths if you wish your "white wings" to remain things of beauty.

The same attention to the sails to avoid mildew should be given to the hull to prevent dry rot, which is quite as frequently caused by the lack of ventilation as by the use of unseasoned timber in the construction of a vessel.

The principal labor of fitting out has been described, but the cabin is yet to be fixed up for occupation, and stores taken aboard for the opening cruise. It is well to have a list prepared of the actual necessities in the way of supplies that must not be left ashore when you get under way. Here are a few things that cannot be dispensed with: Anchor and chain, small kedge anchor, tow-rope, life-buoy, side-lights, anchor light, oil and wicks, bell, foghorn, compass with binnacle, hand lead, chart of waters you intend to navigate, dinghy, either on board or towing astern, properly fitted with oars, boathook, rowlocks and plug, all secured by lashings. A good supply of fresh water should be taken along, and a stock of provisions suitable to the tastes of the skipper and his guests. An awning for the cockpit may prove a great comfort both in hot and rainy weather, when becalmed or at anchor.

I recommend that a storm trysail, a storm jib and a drogue, or sea-anchor, form part of the yacht's equipment, and that they be stowed away in some place

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convenient for instant use. Perhaps they may never be needed, but it is often the unforeseen that happens, and in this world of uncertainty it is best to be always ready for an emergency.

Thus prepared the yachtsman may safely venture for a cruise, selecting those waters with which he is most familiar or most anxious to explore. He will find April an ideal month for yachting, and if he puts in his time to the best advantage he will have his craft "tuned up" to racing pitch, his amateur crew so admirably drilled and disciplined, and his sails and gear in such capital shape that, if there is really any speed in the craft at all, prizes should be the inevitable reward of his skill and his enterprise.

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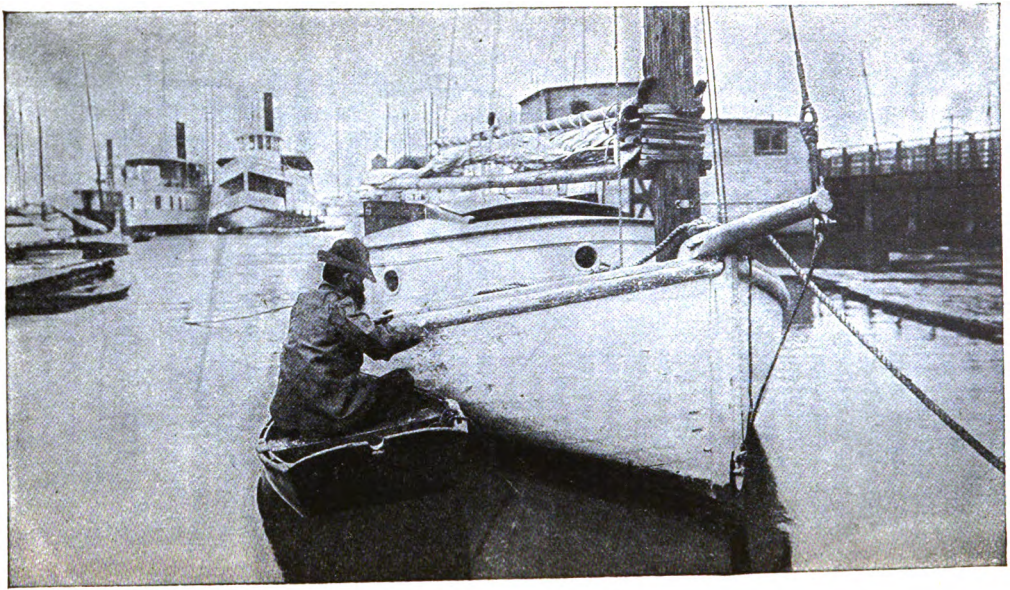

"MAKING READY FOR A NEW DRESS."

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IX.

BEATING TO WINDWARD.

THERE is an old nautical truism to the effect that a haystack will sail well to leeward, but that it takes a correctly-modeled vessel to beat to windward. It is easy to comprehend how a straw hat thrown into a pond on its northerly edge will, under the influence of a brisk breeze from the north, make a fast passage to the southerly bank. It is more difficult to understand how the same straw hat, if put into the water at the southerly end of the pond, might be so manœuvred as to make a passage to the northern extremity of the sheet of water, though the wind continued to pipe from the north. This was, no doubt, a tough nut for the early navigators to crack, and the problem may have taken centuries to solve.

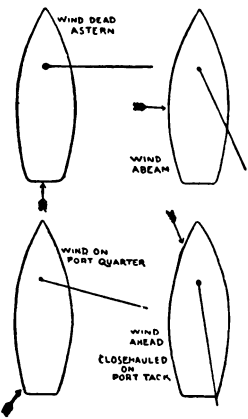

Diagram No. 1.
Sailing under Varying Conditions of Wind.

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The paddle was naturally the first means of propelling a rude craft through the water, and the ingenious savage (probably an indolent rascal) who discovered that a bough of a tree, or the skin of a beast extended to a favoring breeze, would produce the same effect as constant and laborious plying of paddles, was presumably hailed as a benefactor by his tribe. But this device, artful no doubt in its inception, was only of avail while the wind blew towards the quarter in which the destination of the enterprising voyager lay. If the wind drew ahead, or dropped, the skin or leafy bough was no longer of use as a labor-saving contrivance, and the wearisome paddle was necessarily resumed.

The primitive square sail of antiquity embodies the same principle as that governing the motion through the water of the modern full-rigged ship, which is admirably adapted for efficient beating to windward, or sailing against the wind. Superiority in this branch of sailing is the crucial test of every vessel whose propelling power is derived from canvas, and the shipbuilders and sailmakers of all seafaring nations have vied with each other for centuries to secure the desired perfection.

Beating to windward may be described as the method by which a vessel forces her way by a series of angles in the direction from which the wind is blowing. Some vessels will sail closer to the wind than others. That is to say,

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with their sails full, they will head a point or more nearer to the direction from which the wind comes than vessels of different rig.

Broadly speaking, an ordinary fore-and-aft rigged yacht with the wind due north, will head northwest on the starboard tack, and northeast on the port

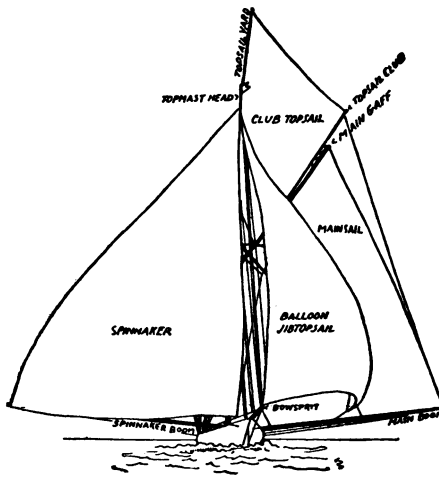

Diagram No. 2.
Running Before the Wind.

tack. That is, she will head up within four points of the wind. Some will do better than this by a good half point. The famous old sloop *Maria*, owned by Commodore J. C. Stevens, founder of the New York Yacht Club, is said to have sailed within three points and a half of the wind, and I am informed

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that *Constitution,* in her races in 1903, achieved a similar remarkable feat.

A square-rigger, because the sails cannot be trimmed to form so sharp an angle to the breeze as a fore-and-aft rigged vessel, rarely sails closer than six points of the wind. Consequently, she has to make more tacks and consume a longer time in accomplishing a similar distance in the teeth of the breeze than a vessel driven by fore-and-

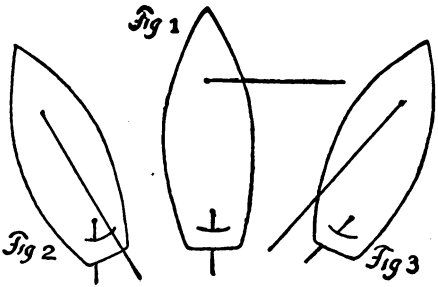

Diagram No. 3.
Gybing.

aft canvas. It is possible to make my meaning clearer by means of simple diagrams, and to these I refer the reader.

A vessel is said to be close-hauled when the sheets are trimmed flat aft and the boat is headed as near to the wind as the sails will permit without their luffs shaking. When a vessel is so trimmed, she is said to be sailing "full and bye," which means as close to the wind as the craft will point with the sails bellying out and full of wind. If

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a vessel is sailed so close to the wind that the sails quiver, the pressure is diminished and speed is decreased. Thus the art of beating to windward successfully consists in keeping the boat's sails full, while her head should not be

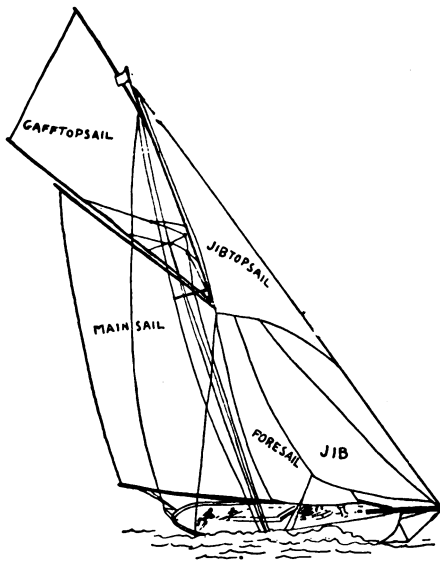

Diagram No. 4.
Close Hauled on Port Tack.

permitted to "fall off" for an instant. This requires a watchful eye and an artistic touch. To become an adept, one should have plenty of practice.

A boat is on the starboard tack when the main boom is over the port quarter and the port jib sheet is hauled aft. The

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wind is then on the starboard bow. The conditions are reversed when the craft goes on the port tack. In diagram No. 1, four conditions of sailing are shown, the figures representing a boat sailing with the wind astern, on the quarter, abeam, and close hauled. It will be observed how the main boom is trimmed to meet the varied changes of wind or course.

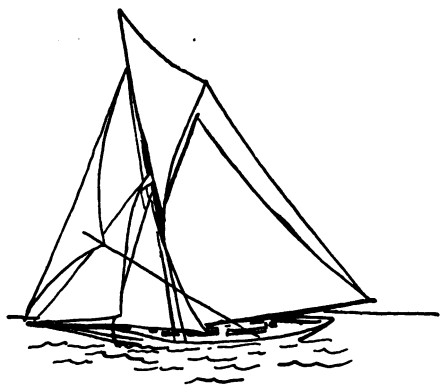

Diagram No. 5.
Close Hauled on Starboard Tack.

Diagram No. 2 shows a racing yacht running before the wind with all her balloons expanded to the breeze. The spinnaker set to starboard not only adds greatly to her speed, but it also makes the steering easier, as it counteracts the pressure of the huge mainsail and club topsail on the port side, thus causing a nicely-adjusted balance. The balloon jibtopsail catches every stray breath of

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air that is spilled out of the spinnaker, and it also has considerable possibilities as a steering sail, in addition to its splendid pulling power. For a vessel, however finely balanced and carefully steered, owing to various conditions of breeze and sea, has a tendency to yaw and fly up in the wind. Thus a strong puff or a heavy sea striking the boat may make her swerve from her course in an effort to broach to. Then the jibtopsail does good service as, when it gets full of wind, it pays the head of the boat off the wind, and materially assists the helmsman in steadying the vessel on her course.

It may be remarked that steering a yacht under these conditions, in a strong and puffy breeze with a lumpy, following sea, calls for the best work of the ablest helmsman. A boat will generally develop an inclination to broach to, which means to fly up in the wind. Sometimes, however, the notion may strike her to run off the wind so

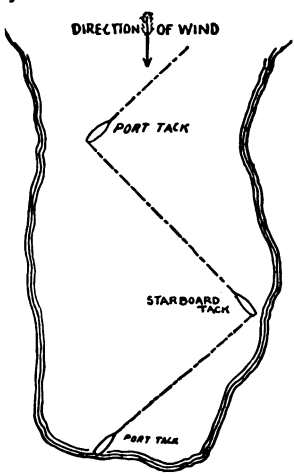

Diagram No. 6.
Dead Beat to Windward.

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much as to bring the wind on the other quarter, causing her to gybe. This would mean disaster, probably a broken boom and a topmast snapped off short like a pipe-stem, with other incidental perils.

Diagram No. 3 shows the manœuvre of gybing, which is to keep the vessel away from the wind until it comes astern, and then on the opposite quarter to which it has been blowing. Fig. 1 shows a boat sailing before the wind with the main boom over to starboard. Fig. 2 shows the operation of luffing to get in the main sheet. Fig. 3 shows the boom over on the port quarter, and the operation complete, except trimming sail for the course to be steered.

It may be remarked that gybing a racing yacht "all standing" in a strong wind requires consummate skill and care. A cool hand at the helm is the prime requisite, but smart handling of the main sheet is of scarcely less importance. The topmast preventer backstays should be attended to by live men. When a vessel is not racing, gybing in heavy weather may be accomplished without the slightest risk; the topsail may be clewed up and the peak of the mainsail lowered, and with ordinary attention the manœuvre is easily performed.

Diagrams Nos. 4 and 5 show the same racing yacht close hauled on the port and starboard tack. The spinnaker and balloon jibtopsail are taken in. A small jibtopsail takes the place of the flying

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kite. This sail, however, is only carried in light winds, as it has a tendency, when a breeze blows, to make a craft sag off to leeward.

Diagram No. 6 shows a boat beating out of a bay with the wind dead in her teeth, a regular "nose-ender" or "muzzler." She starts out from her anchorage on the port tack, stands in as close to the shore as is prudent, goes about on the starboard tack, stands out far enough to weather the point of land, then tacks again, and on the port tack fetches the open sea.

Diagram No. 7 illustrates a contingency frequently met with in beating to windward, when a vessel can sail nearer her intended course on one tack than another. Thus suppose her course is East by South and the wind SE, she would head up East on one tack (the long leg) and South on the other (the short leg).

Diagram No. 8 depicts the manœuvre of tacking that is the method of "going into stays," or shifting from one tack to the other. Fig. 1 shows a boat steering "full and bye" on the starboark tack. It becomes necessary to go about. "Helm's a-lee!" cries the man at the tiller, at the same time easing the helm down to leeward and causing the boat's head to fly up in the wind. The jib sheet is let go at the cry "Helm's a-lee!" decreasing the pressure forward and making the boat, if well balanced, spin round. A modern racer turns on her heel so smartly that the men have all they can do to trim the head sheets

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down before she is full on the other tack. Some of the old style craft, however, hang in the wind, and it sometimes becomes necessary to pay her head off by trimming down on the port jib sheet and by shoving the main boom over on the starboard quarter (Fig. 3). Soon she fills on the port tack, and goes dancing merrily along, as shown in Fig. 4.

In beating to windward in a strong breeze and a heavy sea leeway must be considered.

Leeway may be defined as the angle between the line of the vessel's apparent course and the line she actually makes good through the water. In other and untechnical words, it is the drift that the ship makes sideways through the water because of the force of the wind and the heave of the sea, both factors causing the craft to slide bodily off to leeward.

This crab-like motion is due to a variety of causes, to the shape of the craft, to her trim, and to the amount of sail carried, and its quality and sit. Boats deficient in the element of lateral resistance, such as a shallow craft with the centerboard hoisted, will drift off to leeward at a surprising rate. A deep boat of good design and fair sail-carrying capacity will, on the other hand, if her canvas is well cut and skillfully trimmed, make little or no leeway. In fact, she may, under favorable circumstances, eat up into the wind and fetch as high as she points.

Leeway is always a dead loss, and to

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counteract it is always the aim of the practical seaman and navigator. Captain Lecky, in his admirable work, "Wrinkles in Practical Navigation," puts the case clearly, and his advice should be followed whenever feasible. He says: "Suppose a vessel on a wind heading NW by N, under short canvas and looking up within three points of her port, which, accordingly, bears north; but, owing to its blowing hard, she is making 2½ points leeway. Clearly this vessel is only *making good* a NW by W½W course, which is 5½ points from the direction of port. Let her speed under these conditions be, say, four knots per hour. Now, if the yards are checked in a point or so, and the vessel be kept off NW by W, she will slip away much faster through the water, and probably will make not more than half a point leeway. This keeps the course *made good* exactly the same as before, with the advantage of increased speed. Therefore, if you can possibly avoid it, do not allow your vessel to

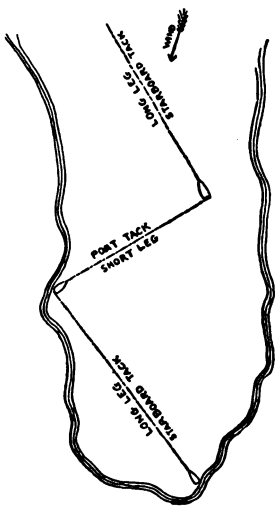

Diagram No. 7.
A Long Leg and a Short Leg.

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sag to leeward by jamming her up in the wind. Keep your wake right astern, unless it be found from the bearing of the port that the course *made good* is actually taking the vessel away from it, in which case it is obvious that the less the speed the better."

This excellent counsel applies to every kind of sailing vessel, whether square-rigger or fore-and-after, whether used for business or pleasure. It is of no avail to pinch a boat for the purpose of keeping her bowsprit pointed for her destination, when it is obvious that she will only fetch a point several miles to leeward. Keep the sails clean full and the boat will make better weather of it, as well as greater speed. It may frequently be necessary to "luff and shake it out of her" when struck by a hard squall, or, by the aid of a "fisherman's luff," to clear an object without tacking, but a good rule is to keep a sailing craft moving through the water and not permit her to pitch and rear end on to the sea.

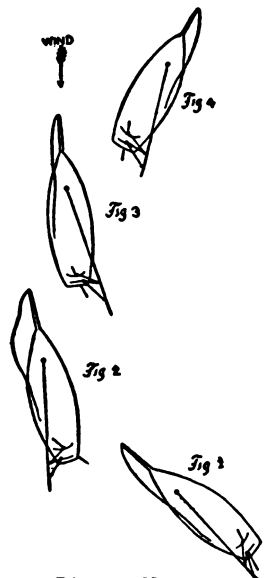

Diagram No. 8.
The Manœuvre of Tacking.

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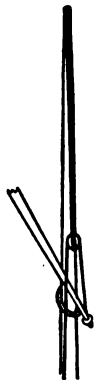
X.

COMBINATION ROWING AND SAILING BOATS.



Whip purchase and traveler. Fig. 1.

A BOAT intended for both rowing and sailing should be partly decked, and have as high a coaming as possible round the cockpit. A folding centerboard should be fitted as in Fig. 10, so as to avoid the awkwardness of a trunk, which in a small craft takes up too much room. Outside ballast is not necessary; a few bags of sand will do instead. An open boat under sail is dangerous except in the hands of a skilled boatman. In a scrub race the helmsman cracks on until the lee gunwale is almost on a level with the water. He may go along like this for some time, but if the water is rough, ten to one a sea will sooner or later come in over the lee bow, and the weight of water to leeward may cause the boat to capsize before the sheet can be let go and the helm put hard down to bring her head to wind. This in itself is not agreeable; and failing to right the boat one may be compelled to cling to the keel or rail until relief comes, or till he gets too tired to hang on any longer.

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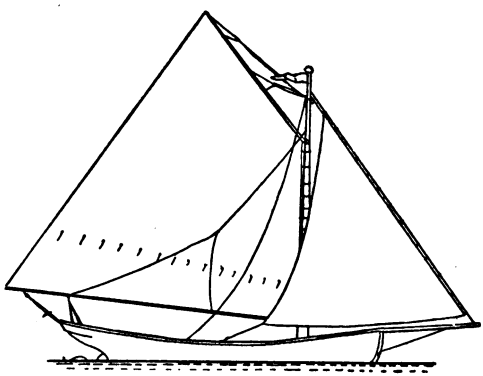
The excellent sport of sailing in a stiff breeze is obtained at its best only in a partly decked boat. The half-decked craft may also be made into a life-boat with the aid of water-tight boxes of tin or zinc. The cockpit should be made as narrow as is compatible with comfort.

The combination rowing and sailing boat should have as little gear as possible. Sheets and halyards should always be kept clear for running and never be allowed to get foul. If you are so unlucky or so imprudent as to meet with a capsize, keep clear of the ropes, for a



Jib and Mainsail Rig. Fig. 2.

turn of one round the leg may send you to Davy Jones's locker..

In writing of rigs suitable for small craft I shall not weary my readers with descriptions of sails that are not at all adapted for practical use in American waters. The amateur desirous of be-

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coming acquainted with the rig of boats suitable for Bermuda waters, the Norfolk Broads, the Nile, or the inland lakes of Timbuctoo must look elsewhere. Nevertheless the amateur may rest confident that I give practical instructions for the best possible rigs, and he may adopt any one of them after due consideration of the comments on each variety without any fear of future regret.

The mast of the combination sailing and rowing boat which is shown in Fig. 2, should be so stepped that it can be taken down at a moment's notice. It should not be stepped into the keelson through a hole in the thwart, but should be fitted with a strong iron clamp and pin screwed to the after part of the thwart, so that it may be unshipped in a hurry. The mast should be light and strong. The sheave-hole in the head should be fitted with a galvanized-iron or yellow-metal sheave, and should be sufficiently large for the halyards to travel freely when the rope is swollen with water. A block may be fitted to the mast-head for the jib halyards. The boat should be provided with a galvanized-iron horse for the lower block of the mainsheet to travel on. This is a great convenience in beating to windward as the boom will go over by itself without the aid of the helmsman. The sail also sets better with the aid of a horse to keep the boom down.

The jib sheets and all halyards should lead aft within easy reach of the helmsman so that he may be able to handle

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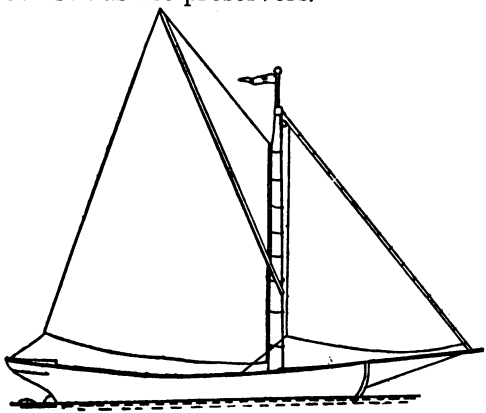
them without letting go the tiller. The cushions of the stern sheets should be stuffed with cork shavings such as grapes come packed in from Spain. They should have life lines sewed to them so that in case of need they may be used as life-preservers.



Sprit Rig. Fig. 3.

The boat should be equipped with three oars (as one may be broken), a boat-hook and a baler; and the plug in the bottom should be secured to the boat by a lanyard and screw-eye. A tiller should be used for steering when sailing and not a yoke and lines.

Remember that you must luff when the first breath of the squall strikes the boat, for if way is lost and the boat is hove down on her beam ends, lee helm ceases to possess its virtue and the boat may capsize. This is a sound and wise axiom and one that a beginner should

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impress rigidly on his mind. Never allow skylarking in a boat. Never attempt to climb the mast of an open boat, as it is an operation fraught with danger. Rather unstep the mast for any repairs that may be necessary. Never stand on the thwarts of a small boat when under way.

If women and children are on board never gybe the boom over. Many accidents have happened through the neglect of this precaution. No matter how expert a boat-sailer you may be, never take women and children out in a boat with only yourself to handle her. Always take care that you have with you either a skilled professional hand or an amateur who knows the ropes, can take his trick at the tiller and does not lose his head in a squall or other emergency of sea, lake, sound or river. In default of being able to command the services of such a man, leave the women and children ashore and postpone the excursion heedless of the tears and entreaties of your best girl and the black looks of your prospective mother-in-law. A lovers' quarrel is easily made up, but a capsized boat may mean loss of life and agonies of regret and self-reproach.

I was once persuaded against my better judgment to take out a party of ladies for a sail in a jib-and-mainsail boat. We put out from a dock at Perth-Amboy in the afternoon, with a cloudless sky and a soft, sweet summer zephyr blowing. There was one other of my sex aboard and he told me he perfectly

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understood the handling of a boat. He wore a yachting suit and cocked his eye aloft in a knowing and nautical manner that deceived even an old stager like myself. A huge black bank of clouds arose in the northwest presaging the speedy approach of a savage thunder-squall. I told my nautical-looking shipmate to lower the jib, but he did not know how to find the halyards, and he was equally ignorant of the whereabouts of the sheet. I gave the tiller to one of the girls to hold, hauled down the jib, made it fast, lowered the mainsail and furled it as snugly as I could and then let go the anchor which, luckily, hadn't been left ashore. All this time my nautical-looking chum was star-gazing. As a matter of fact he knew no more about a boat than a bull knows of trigonometry. His specialty, I was afterwards informed, was measuring off tape by the yard and ogling his customers. I had to do a good deal of hustling to get the craft snug for the squall and to stow away my girl guests in the shelter of the little half-deck forward, where they fitted as tight as sardines in a box.

When the squall struck us it was a hummer and no mistake. I veered out all the cable there was and she rode to it quite well. There came a deluge of rain with the blast, and the boat was soon nearly half full. The girls screamed and prayed. The counter-jumper looked pale about the gills and being too scared to bail flopped on his marrow-bones. Now praying on shipboard is not to be

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scoffed at, but it should be delayed until man has exhausted every possible means of saving the ship. I had to do all the bailing myself and when the squall had blown itself out I had to set the sails and hoist the anchor without any aid from the linen-draper.

That is one reason why I don't go sailing single-handed any more with a boat-load of girls. Do you blame me, shipmates? They are as likely to get cranky as the boat herself, and one female at a time is all the average man can keep on an even keel. Of course I know many girls who can give me points and beat me easily in yachting and all that appertains thereto; but fair ones of that sort are not so plentiful as they might be.

It should be remembered that these small rowing and sailing boats are not intended for a spin round Sandy Hook lightship. They are for smooth water and in their place are capable of affording their owners an immense amount of wholesome enjoyment. On a pinch they will stand a hard tussle with wind and wave, but it is never wise to tempt Providence. I once knew an Irishman who often declared that he was so favored by fortune that he could fall off a dock into the water and not get wet, but the average man is not built that way. An ambitious amateur may well begin his career on the water with one of these interesting little toys I have described, and even if he aspires to become the owner of a stouter and more seaworthy craft in which to essay adventurous

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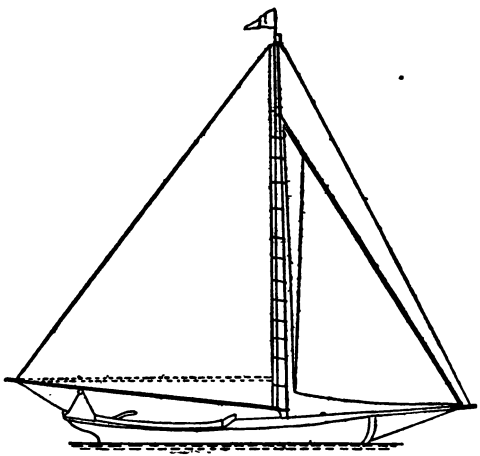
cruises of great emprise, he will learn much that is of value from her.

With these cautionary remarks I will proceed to describe the rigs which in my judgment are suitable for boats measuring from twelve to seventeen feet over all.

The leg-of-mutton rig, whether combined with a jib or not, is the simplest and safest known, for there is no weight aloft such as is inevitable with a gaff.



Leg-of-mutton Rig. Fig. 4.

It is a sail exactly adapted to the requirements of a learner. The most nervous mother need not be alarmed if her boy goes sailing in a boat equipped with this rig. The sail is hoisted by a single halyard bent to the cringle at the head of the sail and rove through either

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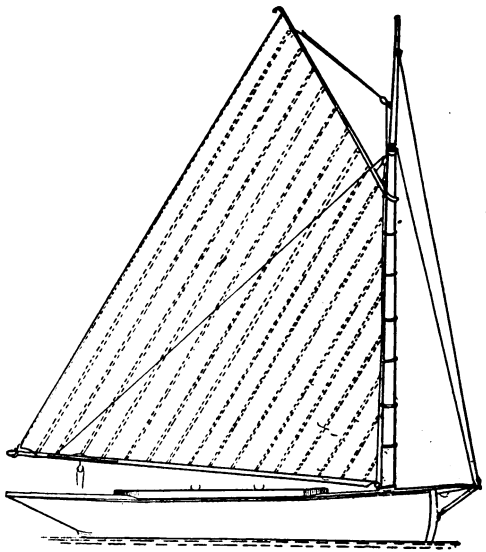
a sheave or a block at the masthead. Sometimes the luff is laced to the mast, but it is better that it should be seized to hoops, as shown in Fig. 4. If a boom is used a larger sail can be carried, but it should be only a light spar and the foot of the sail should be laced to it.



Cat Rig Fig. 9.

The boom may be fitted with a topping lift and the sheet be rove as shown in the illustration. In a small open boat no stays are necessary for the mast, but the jib halyards should be belayed to a cleat on one gunwale of the boat and the main halyards on the other, so as to afford support to the mast.

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The jib and leg-of-mutton sail is a deservedly popular rig. A short bowsprit may be fitted to a boat and secured to an eyebolt in the stem by a wire bobstay. A wire forestay may be set up to the bowsprit end and a jib may be bent to iron hanks on it and hoisted by a single halyard. Or it may be set flying

The advantages of the cat rig (Fig. 9) for general handiness have been often explained. I should advise that the sail be hoisted by both throat and peak halyards and not by a single halyard as is sometimes the case. It is often most convenient to be able to drop the peak, when gybing, for instance, or when struck by a squall. A single topping lift should be fitted with an eye splice to the end of the boom and rove through a block at the masthead and belayed to a cleat on the mast. The main sheet should travel on an iron horse. A short boomkin, with forestay and bob-stay, may help to secure the mast.

The balance lug, which is illustrated in Fig. 8, is quite a popular rig, and it has much in its favor. The sail is laced to a yard and boom and is hoisted by a single halyard rove through a sheave-hole in the masthead and spliced to the eye of the hook of a galvanized-iron traveler, to which a strop on the yard is hooked, as shown in the illustration. On the other end of the halyard a single block is turned in, through which a rope is rove, the standing part of which is made fast to an eyebolt at the foot

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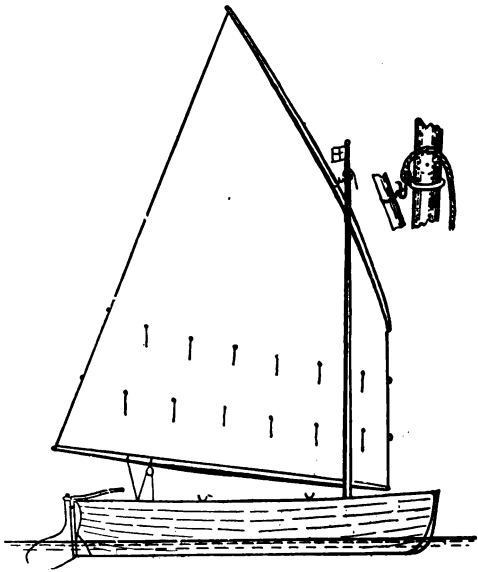

Balance Lug Rig. Fig. 8. Showing Traveler and Halyards.

of the mast and the hauling part rove through a block and led aft within easy reach of the helmsman. The tack should be made fast to the boom and set up to the mast thwart after being passed round the mast. The main sheet should work on a galvanized-iron horse. This rig is quite handy and a boat so equipped is smart in stays.

The sliding gunter rig, which is shown in Fig. 5, has this much to recommend it: it is easily set if rigged as shown in the illustration and it can quickly be reefed. It will be seen that the mast is

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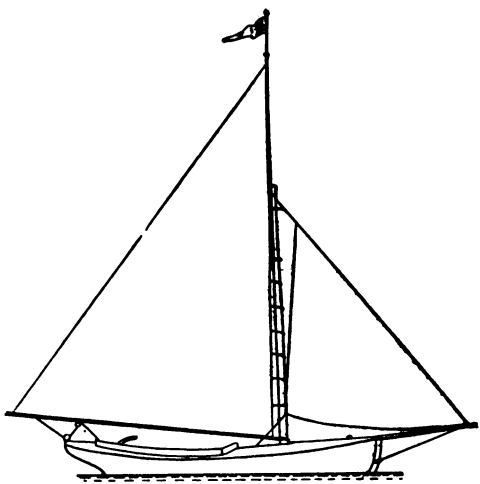
in two pieces, the topmast sliding up and down the lower mast on two wrought-iron rings or travelers. The halyards are sometimes made fast to the lower traveler and sometimes to the upper. They reeve through a sheave-hole in the lower masthead and may be set up with a single whip purchase. The lower mast may be supported with a single wire shroud on each side and, if the double headrig is carried, with a wire stay to the stem head. The sail should be laced to the topmast and secured to the lower mast by hoops or iron rings leathered. These should be large enough to slide easily up and down the mast, which should be kept well greased. The topmast should be so rigged that the upper



Sliding Gunter Rig. Fig. 5.

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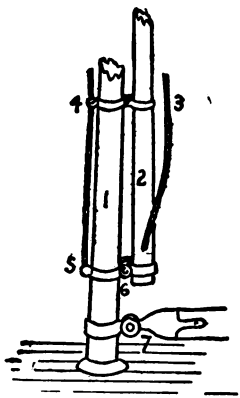
iron can be unclamped and the topmast lowered down so as to permit the sail to be stowed like a gaff-sail along the boom. With the sail thus furled the boat will ride much easier in a breeze or a seaway. In Fig. 6 the working of the rig is shown: 1 is the lower mast, 2 the topmast, 3 the halyards, 4 the upper ring, or traveler, with a clamp



Detail of Sliding Gunter Rig, Fig. 6.

and pin to permit the lowering of the topmast, 5 the lower ring or traveler, which is fitted with a hinge at 6; 7 is the gooseneck of the boom to which the foot of the sail is laced. Reefing is simple. Lower away on the halyards, make fast the cringle on the luff of the sail, at whatever reef band is desired, to the gooseneck on the boom. Haul out the corresponding reef earing, make it fast, tie your reef points and hoist up

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the sail again by the halyards. A topping lift is necessary.

The spritsail is not often seen in these waters, but it is a good sail for a small boat. I warn the beginner, however, against its use in a craft of any pretensions to size, for he will find the heavy sprit much more difficult to handle than a gaff. A spritsail is similar in shape to the mainsail of a cutter, with the peak higher and the foot shorter, as in Fig. 3. The sprit is a spar which crosses the sail diagonally from luff to peak. It is thick in the middle, and each end is tapered. The upper end fits into a cringle or eye in the peak of the sail and the lower end into a snotter on the mast. The sprit stretches the sail quite flat and thus a boat is able to point well to windward. The snotter is a piece of stout rope having an eye in each end, one being passed round the mast and rove through the eye in the other end, the heel of the sprit fitting in the remaining eye. If the snotter carries away, the heel of the sprit may be forced by its own weight through the bottom of the boat; accordingly, as it has to stand considerable strain, it should be made of stout stuff. To set the sail, hoist it up by the halyards, slip the upper end of the sprit into the cringle in the peak, push it up as high as you can and insert the heel into the snotter; then trim the sheet. In large boats the snotter is made fast to an iron traveler which is hoisted by a whip purchase as shown in Figs. 1 and 3.

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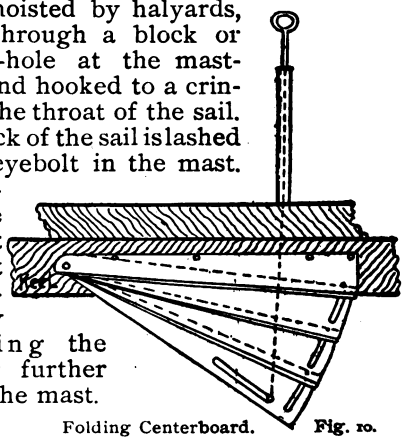
The sprit rig cannot be said to be pretty, and when the sail is large it is difficult to reef it. I should not counsel its use except in a boat intended for both rowing and sailing, where the sail would be so small as to be easily muzzled in case of a squall. The sprit-sail is hoisted by halyards, rove through a block or sheave-hole at the mast-head and hooked to a cringle at the throat of the sail. The tack of the sail is lashed to an eyebolt in the mast. In reefing the sprit must be lowered by shifting the snotter further down the mast.



Folding Centerboard. **Fig. 10.**

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XI.

RIGGING AND SAILS.

WIRE has entirely superseded rope for standing rigging, and dead-eyes and lanyards are fast giving way before the advance of the turnbuckle. An old sailor cannot help regretting the decline and fall of his profession and the growing popularity of the art of the blacksmith. So far as the rigging of ships is concerned, when wire rigging was first introduced it was thought that its rigidity would prove a fatal objection to its successful use.

Science has, however, set its foot down firmly on such objections. The decree has gone forth that rigging cannot possibly be set up too taut, and the less it stretches the better. The old argument that a yacht's standing rigging should "give" when the craft is caught in a squall, which old sea dogs were so fond of advancing, has been knocked on the head by scientific men who declare that a vessel's heeling capacity affords much more relief than the yielding quality of rigging. Thus all or nearly all of the modern immense steel sailing vessels in the East Indian and Australian trade have their steel masts stayed as rigidly as possible by means of turnbuckles, and practice seems to have demonstrated the

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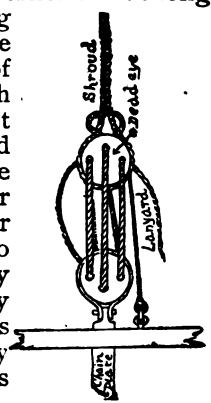
truth of the theory. These ships encounter terrific seas and gales off the Cape of Good Hope and Cape Horn, and their masts are thus subjected to violent and sudden strains, but I have been assured by the commanders of several of these great freight carriers that they have never known their "sticks" to be imperilled by the rigidity of the rigging, and the tauter it can be set up the more secure the masts are supposed to be.

There are, however, a number of old salts who condemn this theory as rank heresy, and go in for deadeyes and lanyards of the old-fashioned kind, and the greater the stretch between the upper and the lower deadeyes the better are they pleased. There is no doubt that turnbuckles look neater than deadeyes, and they are probably well suited for small craft. The Herreshoffs have long used them for setting up the rigging of the sloops and yawls of moderate size which they used to turn out in such numbers, and which first laid the foundation of their fame. The boat owner can please himself as to which method he may choose, and he can rely that with either his mast will be perfectly secure. Both methods are shown in the accompanying cuts.



SHROUD, DEADEYE, LANYARD.

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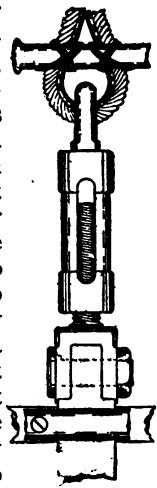
There is one thing in connection with wire rigging that I must warn the amateur against. Beware of shod wire rigging. "Shoes" are iron plates riveted to the ends of wire rigging to receive shackle bolts. They are never reliable. Eye splices in wire never draw. "Shoes" often collapse without notice.



TURNBUCKLE.

Turnbuckles are very handy appliances for setting up rigging in a hurry, whereas the same operation conducted by means of a deadeye and a lanyard takes much more time and trouble. A small craft rigged as a sloop, cutter or yawl, requires only one shroud on each side to afford lateral support to the mast, and a forestay —which in the case of a cutter or yawl should set up at the stem head, but on a sloop is set up on the bowsprit. A simple way to fit the rigging is to splice an eye in each shroud, forming a collar sufficiently large to pass over the masthead, first covering the part that is to form the eye with canvas sewn on and painted. The starboard shroud goes over the masthead first, then the port one and last the forestay. In large yachts the lower rigging is often fitted in pairs, the bight of the shrouds being passed over the masthead

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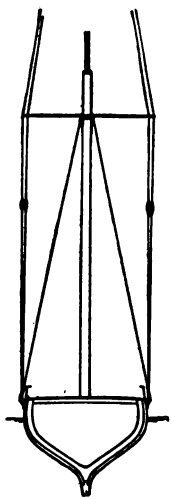
and secured in the form of an eye with a stout wire seizing.

Many riggers shackle the shrouds to an iron band fitted to the hounds. This plan is open to objection. There may be a flaw in the iron and the band may give way suddenly, causing the mast to snap off short like the stem of a clay pipe. Bands may look a little more snug than the collars, but they are heavier aloft and not so reliable, and for these reasons I am old-fashioned enough to prefer the collars.



TOPMAST RIGGING.

For a small sloop, cutter or yawl, a pole mast is preferable; but all boats more than twenty feet on the water line should be fitted with topmasts, the rigging of which is shown in the cut.

The running bowsprit is almost obsolete now-a-days, but the device still finds favor with certain owners of cutters and yawls of large size. It certainly has its advantages. The length of the bowsprit is reduced as the jibs are shifted, until when the "spitfire" or storm-jib is set the bowsprit is run so far inboard that it looks like a mere stump. In a sea-way the benefit of this is obvious, the weight being

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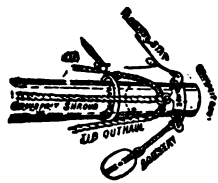
materially reduced forward and the pitching consequently lessened. The jib also sits well and does its work, and is far preferable to that horror of horrors the "bobbed" jib of a sloop, which always makes a sailor's flesh creep when he sees it. How it has managed to survive is a marvel to me. It is a lubberly and slovenly device not good enough for a scow. The rigging of a running bowsprit is shown in the cut.



RIG OF RUNNING BOWSPRIT.

When it becomes necessary to set the storm trysail, lower away the mainsail and furl it as fast as possible. Lower the boom down into the crutch amidships, and secure it by hauling the sheet taut and by tackles or lashings from each quarter. Unhook the throat and peak halyards and hook them on to the trysail gaff, the jaws of which parral on to the mast, allowing the gaff end to rest on the deck. The topping lifts must be unhooked from the main boom and taken in to the mast or the rigging, so as to be out of the way of the trysail. Lace the head of the trysail to the gaff. The clew of the trysail is hauled aft by a luff-tackle which forms the sheet. Another tackle should be

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hooked to the clew and made fast to windward over the main boom and gaff, so that in case of a shift of wind the sheet may be hauled aft on the other side without delay or the danger of getting aback. Then you can man the throat and peak halyards and set the sail, trimming the sheet well down.

If you should have the misfortune to carry away the main boom, and you have no trysail on board, lower away the sail, unlace it from the boom, close-reef it, and set it with a luff-tackle for a sheet. When about to set the storm trysail and your vessel is yawl rigged, set the storm mizzen. It will keep her head up to the sea while the sails are being shifted. In a cutter, heave to by hauling the fore sheet to windward, keeping the jib full. Shifting jibs in heavy weather in a cutter requires care. The first thing to do is to get the sail up from below and stretch it along the weather side of the forward deck with the head aft. Haul the foresheet to windward and trim the mainsheet in flat, tricing up the tack if the sail is loose-footed. Keep the boat as close to the wind as possible. Let go the jib outhaul, and the sail will fly in along the bowsprit. Muzzle it, man the downhaul, let go the halyards and down with it! Then reef the bowsprit. Some cutters are fitted with a rack and pinion wheel, with a handle like that of a winch, for this purpose. If not supplied with this handy contrivance, reeve a heel rope, and after slacking the bob-

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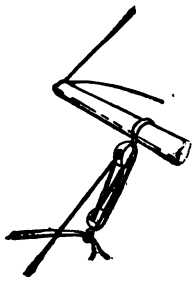
stay fall and the falls of the shrouds and topmast stay, heave on it until you can knock the fid out. Then rouse the bowsprit in by the shroud tackles to the second or third fid holes, as desired; ship the fid and set up the gear, beginning with the bobstay, the weather shroud next and the lee shroud last, at the same time taking in the slack of the topmast stay. Now to set the jib. First hook on the sheets and take a turn with the lee one; next hook on the tack to the traveler and the halyards to the head. Man the outhaul and bowse the tack out to the bowsprit end. Hoist up on the halyards and sweat up with the purchase. Trim the sheet, let draw the foresheet, ease off the mainsheet and sail her along again. If these instructions are carried out a storm jib may be set on a reefed bowsprit without parting a rope yarn.



HORSE FOR MAIN SHEET.

To shake a reef out in the mainsail, set up on the topping lift so that it may take the weight of the boom. Untie all the reef points. Cast off the lashing at the tack if the sail is laced to the boom, or come up the tack tackle if it is loose-footed. Then ease off the reef earring and hoist the sail, setting up the throat first. You can then ease up the topping lift and trim sheet.

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A convenient method of bending and unbending a storm trysail is shown in Fig. X and Fig. E.

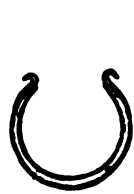

FIG. X.

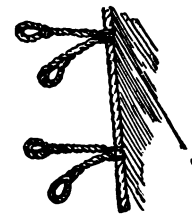

FIG. E.

Fig. X represents the shape of the mast hoops, to each of which two iron hooks are fastened. The hoops are of the ordinary size, but about one-quarter of their length is sawn out and to the ends the iron hooks are riveted. Fig. E shows how the thimble toggles are seized to the luff of the sail at regular intervals. When it is necessary to set the trysail, adjust the jaws of the gaff to the mast, make fast the parral, hook on the throat and peak halyard blocks and mouse them. Hoist up slowly, slipping the thimbles over the hooks on the ends of the hoops as the sail goes up. The sheet must be hauled aft before the sail is hoisted, and should be slacked off handsomely to allow the sail to be properly set. Then all hands should clap on it and flatten it in.

If your boat is rigged as a cutter or yawl the foresail may have the tack made fast to the eyebolt to which the stay is set up. The luff of the sail is seized to galvanized iron hanks that run

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up and down on the stay. If the foresail has a reef band in it (as it should) a lacing is used between the reef and tack cringles. Don't bowse up the halyards too taut the first time you set the sail, and don't break your back flattening in the sheet. Give it a chance to stretch fairly. The same remark also applies to the jib, whether set on a stay or flying on its own luff, as it must necessarily do if your craft is equipped with a running bowsprit.

For the sake of lightness, blocks are frequently made too small. Manilla rope, of which both sheets and halyards should be made, has a habit of swelling when wet. It is generally rove on a dry day, and renders through blocks quite easily when in this condition. A rain squall will swell this rope to such an extent, and halyards will jam so hard, that sails will not come down when wanted, and disasters happen. The work of setting and taking in sail is made very laborious through small blocks and large sized halyards. It should be borne in mind that halyards ought to run through blocks as freely when wet as dry. Blocks should always be fitted with patent sheaves.

The running rigging of a mainsail consists of peak and throat halyards, topping lifts, main sheet and peak downhaul. To bend a mainsail, shackle the throat cringle to the eyebolt under the jaws of the gaff, stretch the head of the sail along the gaff, reeve the peak earring through the hole in the end of

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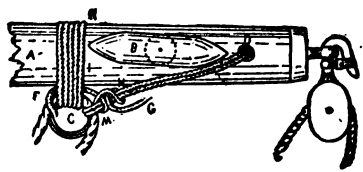
the gaff and haul it out, securing it in the manner shown in the illustration. The earring is represented with the turns passed loosely in order to give the amateur a clear and distinct view of the proper method. It will be seen that *a a* is the peak end of the gaff; *b* is a cheek block for the topsail sheet; *c* is a block for the peak down haul, used also as signal halyards, hooked to an eyebolt screwed into the end of the gaff, the hook of the block being moused; *d* is a hole in the gaff end through which the earring is passed. The earring is spliced into the cringle with a long eye splice.



It is then passed through *d* round through the cringle *e;* through *d* again and through *e* again; then up over the gaff at *i* and *k*, down the other side and through *e* again, and so on up round the gaff four or five times; at the last, instead of going up over the gaff again, the earring is passed between the parts round the gaff as shown at *f*, round all the parts that were passed through *d*, as shown at *m*, and jammed by two half hitches *m* and *h*.

If the sail is new from the sailmaker's loft, only haul the head out hand taut or you will ruin it. I have seen yacht skip-

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pers clap a "handy billy" tackle on the head of a new mainsail and haul on it till they could get no more. I have seen them treat the foot in the same way, the result being a great bag of canvas of no possible use in beating to windward. A mainsail costs a good deal of money and is easily spoiled. One of Mr. John M. Sawyer's splendidly cut sails can have all its utility and beauty taken out of it in half-an-hour by a lubberly sailing master.

After the head earring is passed, lace the head of the sail to the gaff, taking a half hitch at each eyelet hole. Next seize the luff of the sail to the mast hoops with marline. The foot of the mainsail should next be made fast to the boom in the same manner as the peak, the lacing going round a wire jackstay rove through eyebolts on the top of the boom. Do not "sweat up" either the throat or peak halyards too taut the first time you set it, and avoid reefing a new sail. Lower it down altogether, set the trysail, or do the best you can under head sail and the mizzen if on board a yawl. A mainsail should always be allowed to stretch gradually, and the slack of the head and the foot should be taken up at intervals. Remember that no greater injury can be done to a new sail than to try and make it sit flat by hauling out the foot too taut before it has been properly stretched. The best authorities advise that the sail should be set with the leech slack, and the boat run before a strong

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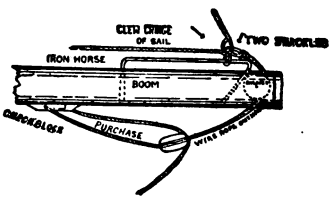
wind for several hours. Another excellent plan is to hoist the sail up with the foot and head slack while the boat is at anchor, and as it flaps about in the breeze the sail will stretch without injury. Of course when the head and foot are thoroughly stretched they can be hauled out taut as they can be got.

Personally, I prefer a mainsail with the foot laced to the boom, but all are not of my way of thinking. A loose-footed mainsail still has admirers and this is how it works. The mainsail outhaul consists of an iron horse on the boom, a shackle as traveler, a wire outhaul made fast to the shackle and rove through a sheavehole at the boom end and set up by a purchase.



GEAR FOR HAULING OUT LOOSE-FOOTED MAINSAIL.

If the mainsail is of the loose-footed variety it should be fitted with a tack tricing tackle and a main tack purchase. The last named is handy for bowsing down the luff of the sail "bar taut" for racing. Sweating-up the throat halyards lowers the peak slightly, and peaking the sail slackens the luff. By hauling up on the main tack tricing tackle till you can get no more, and at the same time lower-

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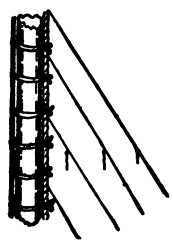
ing the peak, the mainsail is "scandalized" and the boom can then be gybed over in a strong breeze with the least possible risk of carrying away something.

To prevent masthoops from jamming when the mainsail is being hoisted or lowered, a small line is seized to the foreside of the top hoop and then to every hoop down the mast. When the throat halyards are pulled on, the foresides of the hoops feel the strain and go up parallel with the after sides. The accompanying figure shows this at a glance.



It is true that this method has found little favor with amateurs, but I tried it with great success on my first cruising craft, and later on in a yacht of far greater pretensions. The "wrinkle" should by no means be despised.

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XII.

LAYING UP FOR THE WINTER.

THE judicious yachtsman will personally superintend the laying up of his craft. If he has that inestimable blessing, a good skipper, he should not discharge him at the close of his summer season. If he does he will bitterly regret it. A yacht requires as much watchful care as a baby, and this is especially true during the trying winter season. So wise yacht-owners who have in their employ faithful captains should hold on to them like grim death to a deceased army mule. Good men are not too plentiful these times.

A few practical suggestions as to preparing the vessel for the winter are here appended. In the first place, sails should be well dried before being unbent, and then should be carefully stopped and labeled, and the same remark applies also to the running gear. By all means secure storage ashore for sails, gear, cabin fitments and furniture, carpets, upholstery and bedding, otherwise you may have cause to regret it in the spring. In most of the buildings devoted to the storage of yacht gear proper platforms or stages are provided, so that a free current of air may circulate, and thus prevent damp, mildew and decay. The lower tier on the platform should consist of the warps and

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running gear, on top of which the sails should be snugly coiled. Above these the furniture, bedding and upholstery should go. All can be covered over with an old light sail to protect them from dust. This can be removed as often as necessary for airing purposes.

On the other side of the Atlantic judicious owners of storage warehouses make their platforms rat-proof, following out the same idea as the farmer does with his wheat stacks. Each support to the stage is capped with a metal cone, which effectually stops the upward progress of the sail-devouring vermin. Well-conducted warehouses are well ventilated, and the temperature is kept tolerably even by heat.

Of course, all articles of value, such as plate and nautical instruments, should find repository in their owner's dwelling.

All light spars should be sent ashore and lashed up under the beams of the warehouse. The same with the row-boats, but with attention to the fact that they should be so supported as to have their weight evenly distributed, and thus prevent them from being pulled out of shape.

Many expensive boats are hopelessly ruined by neglect of this precaution. This is the proper method of supporting a rowboat so that straining her is impossible. Six eyebolts should be screwed into the under side of the beams of the warehouse at proper intervals to take the weight of the boat amidships and at the third of her length

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forward and aft. From these eyebolts ropes of sufficient length should depend, to which, in the bight, a handspike is passed, on which, bottom upward, the boat is hung.

A yacht laid up without the greatest care deteriorates in value to an enormous extent. The first process after dismantling is to clean the vessel thoroughly inside and out, just as carefully as if she was about to be continued in commission. After getting her as bright as a new pin, all the hardwood—that which is varnished or gilded—should be covered up with canvas.

After the yacht has been thoroughly skinned, as far as her internal arrangements are concerned, the last process preliminary to paying her out of commission, is to give her decks a coat or two of bright varnish—shunning that mixture known in the trade as pure oil, as deleterious to all decks.

It is cheaper in the long run to provide a yacht with properly fitted winter hatches which entirely cover the hardwood deck fittings and secure thorough ventilation, as then the regular skylights can be left open.

In small craft the sailing master will be sufficient to keep the boat in first-class condition. On larger vessels, according to size, he should have competent assistance.

Whether a yacht is moored alongside a quay or another vessel, winter storms cause her to do a little rolling, which invariably induces chafing. Unless a

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vessel is properly protected by fenders, her plankshеer and bulwarks are sure to be seriously injured, and to repair this part of a ship is costly in the extreme, especially in regard to the plankshеer. Should the plankshеer be "shoved up" by contact with the dock or the ship to which she is moored alongside, the damage done could only be properly repaired by the removal of both bulwark and rail. To guard against severe injuries of this kind unceasing vigilance is necessary. If you can induce your skipper to live on board, all the better. In such a case your yacht will be kept in as dainty condition as your wife's boudoir. Snow is very penetrating. It will find its way even through rubber boots. A little leak may at first have no significance. But the leak increases and rot follows, fastenings are corroded and paintwork discolored.

Every vessel afloat suffers more or less from "sweating," caused by the difference between the temperature of the air outside and inside the ship. To obviate this a fire should be kept going; not a furious furnace that would involve a great expenditure of coal, but simply some heating device that gives a moderate amount of warmth all through the ship. Thus, when the owner returns to his yacht in the spring, he will find her sweet and clean, and will never regret the few paltry dollars it has cost him to keep his floating summer home in seagoing condition. The careful

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skipper will see that his extra help is kept busy, so that not only a casual visitor must compliment her owner on her spick and span condition, but a naval architect or a Lloyd's surveyor can find no flaw or fault to peck at. For, down to her deadwood and timbers, by the application of soap, hot water and plenty of elbow-grease, she is made fit for repainting right down to her keel.

By conservative and preservative methods such as these a yacht's life is prolonged, and she will always fetch her value in the market, the noisome odor of bilge water being unknown.

The foregoing remarks are applicable to pleasure craft that are kept afloat during the winter. It is needless to expatiate on the benefit of hauling out yachts of any size or construction, whether of wood, composite, iron, steel or Tobin bronze or aluminum. The expense of hauling large boats out is considerable, for obvious reasons, and thus it is that yacht owners do not care to incur the cost. This objection does not apply to small craft, which should invariably be landed for the winter and efficiently protected by canvas, or other covering, from the destructive influence of snow and rain. All that has been said above in relation to the storage of sails and gear applies as much to a one-tonner as to the largest pleasure craft afloat.

When we go into the question of steam yachts, no better advice can be given than that contained above, so far

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as hull and equipment are concerned. It is different when the proper care of machinery is considered. There it is where the services of a loyal and skillful engineer come into full play. Unless sufficient attention is paid to a vessel's boilers and engines during the critical time when she reposes in dock, disastrous results, entailing vast expenditure, are sure to follow. The complicated and ingenious mechanism which propels the modern steam yacht requires devoted regard. Very expensive when new, repairs during their second season, if in any way neglected in the winter, call for the resources of the purse of a Crœsus. In matters of this kind the old adage which relates to a stitch in time should be noted by the prudent yacht owner. Thus it is that an engineer and a sufficient staff should be kept on the pay roll in the winter for economic reasons alone. By this means extravagant bills for unnecessary repairs will be avoided. The engineer will take pride in his work and do justice to a liberal employer.

It is well known that engineers can only become acquainted with the true capacity of machinery by long and careful study. Statistics have proved that marine engines in the navy under the direction of good men have been run with less coal, less oil and greater working power year by year when the same man has had control of the engine-room. All of which means less strain on the owner's bank account.

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Lincoln's famous aphorism about the unwisdom of swapping horses when crossing a stream applies with great precision to skippers and engineers. It takes time for the most masterly and adroit captain to become acquainted with the peculiar idiosyncrasies of a vessel, for it is true that each one has her own individuality, and it takes time to comprehend her. In this they much resemble the fair sex. It is a case of whip and spur on one hand, and saddle and bridle on the other. Which is to wield the whip or wear the saddle is a question between captain and ship. The struggle is sometimes a long one, but in the end mind conquers matter.

The captain, as in the case of Gen. Paine and the *Mayflower*, eventually gets the hang of her, brings her into a state of submission, and compels her to become a cup winner. The engineer in his own sphere accomplishes similar results. His machinery runs with the regularity of a chronometer. His owner's bills for coal and oil are confined within reasonable limits. There are no breakdowns. His firemen implicitly obey his orders, and all goes well in engine-room and stoke-hold.

If these few practical suggestions and hints prove of any service to yachtsmen, captains and engineers, the writer will feel happy. He has simply touched on the limits of a wide and fertile subject that might be expatiated upon at a large expense of paper and printer's ink.

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XIII.

USEFUL HINTS AND RECIPES.

TO whiten decks, mix oxalic acid with fresh water in the proportion of one pound to the gallon. Apply lightly with a mop and wash off immediately.

Good elastic marine glue for paying seams after they are caulked, can be made of one part of india rubber, twelve parts of coal tar heated gently in a pitch kettle, and twenty parts of shellac added to the mixture. When about to use this preparation, dip the caulking iron, used to drive the oakum or cotton thread into the seams, in naphtha, which dissolves the glue and helps to closely cement the seams. If oil is used instead of naphtha, the glue will not adhere. When melting marine glue for paying, take care to heat it very slowly.

Mildew on sails is almost impossible to remove, but the stains can the rendered a little less unsightly by well scrubbing the sail on both sides with soap and fresh water, and then leaving the sail to dry and bleach in the sun. Avoid the use of chloride of lime or other caustics or acids, which, while they might take out the mildew stains, would certainly rot the duck. Sometimes sails must necessarily be stowed when damp or wet, but they should be

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hoisted up to dry as soon as practicable. Every boat should be provided with water-proof sail covers.

Composition paints and other mixtures for preventing the fouling of boats' bottoms are plentiful as clams. Each one is warranted to be a specific against weeds and barnacles. But wooden or iron vessels, however treated, if left for any length of time at anchor anywhere on the Atlantic or Pacific coasts, are sure to become encrusted with barnacles and to be covered with such a rich growth of marine grasses as would take some particularly active work with a lawn mower to remove. Luckily small boats can easily be hauled out and scrubbed, but those with any pretension to size should most certainly be coppered. Copper in salt water will keep clean for a long time, the exfoliation being extensive. Some authorities recommend that the copper be coated with one or other of the compositions prepared for that purpose, but I think that to leave the copper clean will be more satisfactory in the long run. A coppered cruising vessel should not require her bottom to be cleaned more than four times in the season, but the oftener a racing yacht is hauled out to have her copper burnished the better should be the result, so far as speed is concerned.

There are several capital paints in the market with which to coat a yacht or boat below the water-line. But admirable though they may be, they are by no means weed or barnacle proof.

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In choosing a binocular marine glass, take care not to be persuaded into buying a trashy article. A good one should have a magnifying power of seven times, as well as what is known as good definition—that is, the quality of showing all the outlines of an object with complete distinctness and without any haziness. To find out if a glass has this quality, direct it at any object clearly outlined against the sky—a church steeple, for instance. If the outlines of the object are indistinct, or if they are bordered with violet, blue, orange or red light, reject the glass, as it will never be worth anything. The frame of the glass should be rigid, or the tubes will become twisted and then you will see two objects in place of one. The more powerful a glass is the less field it possesses. While high power is desirable, it is well that a glass should have a large field. A poor glass is worse than none at all.

That sterling seaman, Capt. S. T. S. Lecky, tells a capital story about a marine glass, which I commend to anybody about to purchase one. In the window of a shop he noticed a binocular with a tag on it, which asserted that the glass had rendered an "object" visible at the distance of ninety miles. This was attested by a letter to be seen within. The captain's curiosity was excited. On inquiry in the shop he found out that the "object" was none other than the peak of the Island of Tristan d'Acunha, in the Southern ocean, which is so lofty that it can be seen in clear

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weather by the naked eye at a distance of one hundred miles. Therefore I say let your motto be *caveat emptor* when you go cruising about in search of either a cheap marine telescope or binocular among marine store dealers or pawnshops. Remember that clearness of definition is more to be sought than high magnifying power, as in misty weather the glass with the last-named quality in a marked degree magnifies the haze as well as the object, and, of course, makes it still more blurred and indistinct—a defect on which it is unnecessary for me to further enlarge.

It is hard to distinguish with a low-priced binocular on a thick or rainy night the color of a vessel's lights, a white one sometimes appearing with a green or reddish tinge, and a green one looking like a white one. This applies also to lightships and lighthouses, and should make you careful as to your selection of a glass.

Captain Lecky says the proper way to test a binocular for night use is not to stand at a shop door in broad daylight, trying how much the glass enlarges some distant clock-face, but to wait till nightfall and test it by looking up a dark street or passage, and if figures before only dimly visible to the naked eye are rendered tolerably clear by the aid of the glasses, you may rest assured you have hit on a suitable instrument. It is well to go in the first place to an optician, and not to a "shoptician" versed in cheap-jack methods.

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Iron ballast should be coal-tarred, painted, or white-washed with hot lime.

Masts and spars should be scraped and sand-papered. If there are any cracks in them, they should be stopped with marine glue before scraping. Apply a coat of wood-filler, then a coat of spar composition. When hard, give a second coat. Never apply varnish when there is much moisture in the atmosphere. In the vicinity of New York, wait till the wind is northwest if you wish to secure the best and most brilliant results.

If your boat is white, when repainting don't forget to mix a little blue with your white lead, raw linseed oil and dryers. This cerulean dash improves the look of the paint, and is far better than black, which produces a ghastly tint.

SCOWING AN ANCHOR.

When for any purpose it becomes necessary or desirable to anchor a small boat on ground known, or suspected, to be foul, it is advisable to scow the anchor. Unbend the cable from the ring; make the end fast round the crown shank and flukes with a clove hitch, and bring the end *a* back to *s*, and stop it round the cable with a piece of spun-yarn; take the cable back to the shackle and stop it as at *b*. When the cable is

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hauled upon by the part *o*, the stop at *b* will part and the fluke of the anchor can be easily broken out and lifted. For larger vessels a trip-line is sometimes bent to the crown and buoyed instead of scowing the anchor.

A capital composition for painting the bottoms of boats up to the water-line is made as follows: Take one pound of red lead, four ounces of copper bronze powder, the same weights of arsenic, chrome yellow and paris blue, one pint of dryers, one pint of boiled oil and one pint of copal varnish. Mix thoroughly, strain and apply. If too thick add more varnish. It will dry a rich copper color. It is neither barnacle nor weed proof, but is as good as some of the more expensive paints which pretend to possess both these qualities. Before painting, scrub the wood well and smooth down with pumice stone. Let it thoroughly dry before you begin to use the brush.

A good black paint for the outside of boats is made thus: To six pounds of best black paint add one pound of dark blue paint and half a pint of dryers. Mix with equal quantities of raw and boiled linseed oil until of the proper consistency. Stir well. Strain carefully, and then add one pint of copal varnish.

To stop cracks in a spar: When the spar is thoroughly dry run in marine glue. When the glue is hard scrape some of it out and stop the crevice with putty stained the same color as the spar.

Iron mould and other stains can be removed from a deck by a solution of one

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part of muriatic acid and three parts of water.

THE LEAD LINE.

The hand lead weighs fourteen pounds. The line to which it is attached is twenty-five fathoms long, and is marked as follows: At two fathoms, leather with two ends; at three fathoms, leather with three ends; at five fathoms, white muslin; at seven fathoms, red bunting; at ten fathoms, leather with hole in it; at thirteen fathoms, blue serge; at fifteen fathoms, white muslin; at seventeen fathoms, red bunting; at twenty fathoms, strand with two knots in it. By the different feel of the materials used it is easy to distinguish the marks in the dark. In sounding when the boat is in motion, swing the lead round and heave it as far forward as you can. By filling the hollow at the base of the lead with grease or tallow, a sample of the bottom mud or sand adheres to it, which may be useful in verifying the position of the boat by comparing it with the chart on which the nature of the bottom is indicated.

The first fathom of the hand lead line for use in a boat of light draught may be marked off in feet in any legible manner satisfactory to the marker.

The marks on the deep sea lead line commence with two knots at twenty fathoms, another knot being added for every ten fathoms, and a single knot at each intermediate five.

A hand lead for use in a small craft need not be so heavy as fourteen pounds.

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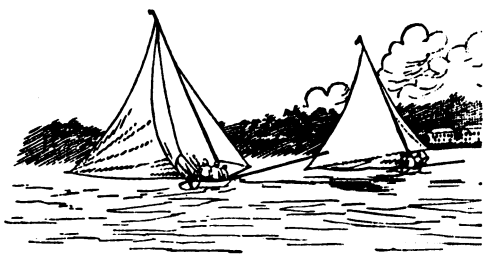
It may not be generally known that all watches are compasses if used according to the following instructions. Point the hour hand to the Sun, and the South is exactly half-way between the hour and the figure XII on the dial. For instance, suppose it is four o'clock; point the hand indicating four to the Sun, and II on the dial is South. Suppose again it is eight o'clock; point the hand indicating eight to the Sun, and the figure X on the dial is South. Some cranks carry a compass card in their watch case so that they may always determine without delay or trouble the direction of the wind whenever the Sun is visible.



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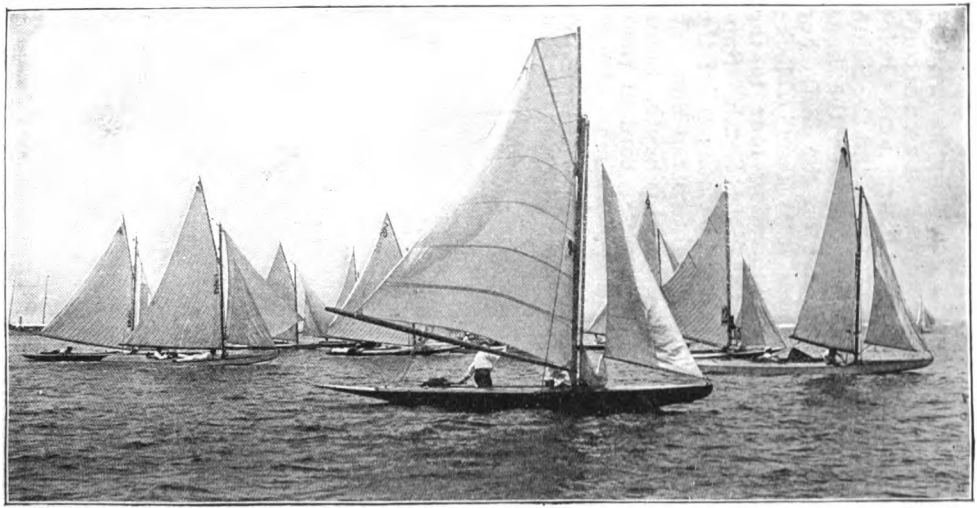

Photo· by J. S. Johnston. "HALF RATERS."

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XIV.

RULE OF THE ROAD AT SEA.

THE boat sailer must possess a knowledge of the rule of the road at sea, unless he wants his sport brought to an untimely end by collision. He should become thoroughly familiar with the International Steering and Sailing Rules, so that if he encounters steamships, fishing craft, pilot boats, etc., he will be able so to maneuver his own vessel as to escape collision.

The prudent skipper of a little vessel should always give steamships and ferry-boats a wide berth. Big steamships sometimes are slow to answer their helms, and often will not get out of the way of small craft, although compelled to by international law. Should your boat be run down by one of these monsters of the deep you, of course, have your remedy in a court, but you are apt to find litigation very expensive when suing a steamship company, and a suit often lingers for years until, having exhausted every process, it finds itself at last on the calendar of the Supreme Court of the United States.

It is not advisable to attempt to cross the bows of a steamer unless you have plenty of room and you are a good judge of distances. Steam vessels go at a faster rate than they seem to, and the

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momentum of their impact is very great. Instead of crossing a steamer's bow go about on the other tack, or haul your foresheet to windward till she has passed. Discretion is always the better part of valor. Not to monkey with ocean steamships or ferryboats is as valuable advice as that time-honored warning to boys not to fool with the buzz-saw.

Do not get "rattled," whatever you do, but keep your eyes "skinned" and your head clear.

Skippers of ferryboats often try to show off their smartness by steering as close as possible to small pleasure boats and then giving them the benefit of their wash, sometimes swamping their unfortunate victims. It is fun for the fellow in the ferryboat's pilot-house, but it is the reverse of pleasant to the man wallowing in the seething water. Therefore, do not court danger by approaching too near these unwieldy marine brutes, but if you are so luckless as to get into their wash handle your boat so that she shall not get into the trough of the waves, but take the sea on the bluff of the bow, where it will do the least harm.

Navigation by daylight in fine, clear weather is easy, but when it is dark and foggy special precautions must be taken or collision is inevitable. I do not propose to reprint in this little book the full text of the international regulations for preventing collisions at sea, but I have prepared an abstract, which will be sufficient for the practical purposes of an amateur sailor.

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LIGHTS.

Between sunset and sunrise the following lights shall be carried by a steamship when under way:

At the foremast head a bright white light, visible on a clear night at a distance of five miles, showing the light ten points on either side of the ship from right ahead to two points abaft the beam.

On the starboard side a green light showing from right ahead to two points abaft the beam, visible at a distance of two miles.

On the port side a red light similar in all respects, except color, to the green light.

To prevent these green and red lights from being seen across the bow they must be fitted with inboard screens projecting at least three feet forward from the light.

Steamships towing other vessels shall carry two white masthead lights in addition to their side lights.

Sailing vessels when under way or being towed shall carry only the green and red lights as provided for steamships under way.

Small vessels that cannot carry fixed side lights in bad weather must have them on deck on their respective sides ready for instant exhibition on the approach of another vessel.

All vessels at anchor shall show where it can best be seen, at a height not exceeding twenty feet above the hull, a white light in a globular lantern of eight

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inches in diameter, visible all round the horizon at a distance of at least a mile.

Pilot vessels shall only carry a white light at the masthead, visible all round the horizon, and shall exhibit a flare-up light every fifteen minutes.

Open boats are not required to carry fixed sidelights, but must, in default of such, be provided with a lantern, having a green slide on one side and a red slide on the other, which must be properly shown in time to prevent collision, taking care that the green light shall not be seen on the port side nor the red light on the starboard side.

Fishing and open boats, when at anchor or riding to their nets and stationary, shall exhibit a bright white light, and may, in addition, use a flare-up light if deemed expedient.

FOG SIGNALS.

In fog, mist, or falling snow, whether by day or night, a steamship under way shall blow a prolonged blast of her steam whistle every two minutes, or oftener. A sailing vessel under way shall blow her foghorn (which must be sounded by a bellows or other mechanical device and not by mouth power) at intervals of not less than two minutes, when on the starboard tack one blast, when on the port tack two blasts in succession, and when with the wind abaft the beam three blasts in succession.

Vessels not under way shall ring the bell at intervals of not less than two minutes.

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STEERING AND SAILING RULES

FOR SAILING VESSELS.

A ship running free shall keep out of the way of a ship closehauled.

A ship closehauled on the port tack shall keep out of the way of a ship closehauled on the starboard tack.

When both are running free with the wind on different sides, the ship which has the wind on the port side shall keep out of the way of the other.

When both are running free with the wind on the same side, the ship which is to windward shall keep out of the way of the ship to leeward.

A ship which has the wind aft shall keep out of the way of the other ship.

FOR STEAM VESSELS.

If two ships under steam are meeting end on, or nearly end on, so as to involve risk of collision, each shall alter her course to starboard so that each may pass on the port side of the other.

If two ships under steam are crossing so as to involve risk of collision, the ship which has the other on her own starboard side shall keep out of the way of the other.

Steamships must, in cases where there is risk of collision, keep out of the way of sailing vessels.

A vessel, whether sail or steam, when overtaking another, must keep out of the way of the overtaken ship.

Where by the above rules one of two ships is to keep out of the way, the other shall keep her course.

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The following rhymes should be committed to memory:

When both sidelights you see ahead,
Port your helm and show your red!
Green to green or red to red,
Perfect safety—go ahead!

If on the port tack you steer,
It is your duty to keep clear
Of every closehauled ship ahead,
No matter whether green or red.

But when upon your port is seen
A stranger's starboard light of green,
There's not so much for you to do,
For green to port keeps clear of you.

A ship which is being overtaken by another shall show from her stern to such last-mentioned ship a white light or a flare-up light. This rule was only adopted in 1884, but I saw it practically exemplified in the ship *Rajah of Cochin* in the year 1874. The *Rajah* was running down the Southeast trades one pitch dark night in April, homeward bound; I was in charge of the deck. We had studdingsails set on both sides, on the mainmast and foremast. Suddenly out of the darkness astern there loomed up the sails on the foremast of a big ship whose jibboom seemed to be right over the *Rajah's* stern. She carried no side lights, her skipper being probably of an economical turn of mind. I took the lighted lamp out of the binnacle, and jumping on the wheel gratings waved it as high as I could, at the same time yelling with all my might. I could hear the man on the lookout

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aboard the pursuing vessel roar out, and then came a clatter and a rattle of ropes and a flapping of sails as with her helm hard to port the ship that was pursuing us luffed out across our stern. She snapped off a few stunsail booms, but that was better than running us down. Capt. Sedgwick, who was in command of the *Rajah*, was awakened by the noise and came up from below in his pajamas. He quickly realized what a close shave his ship had experienced.

BUOYS AND BEACONS.

In approaching channels from seaward red buoys marked with even numbers will be found on the starboard side of the channel and must be left on the starboard side in passing in. Black buoys with odd numbers will be found on the port side of the channel and must be left on the port hand in passing in.

Buoys with red and black horizontal stripes will be found on obstructions with channel ways on either side of them, and may be left on either hand.

Buoys painted with black and white perpendicular stripes will be found in mid-channel, and must be passed close aboard to avoid danger.

All other marks to buoys will be in addition to the foregoing and may be employed to mark particular spots, a description of which will be found in the printed Government lists.

Perches, with balls, cages, etc., will, when placed on buoys, be at turning points, the color and number indicating on what side they shall be passed.

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XV.

THE COMPASS.

I HAVE no space in this volume to write an exhaustive chapter on navigation. It is, however, an art easily acquired, and may be wholly self-taught. There are certain rudimentary rules for finding one's way at sea by dead reckoning, that everyone starting out on a cruise should master. The instruments needful are a compass, parallel rulers, dividers, patent log, lead line, aneroid barometer, clock, and the necessary charts of the sea which it is proposed to navigate.

In a small cruiser a compass is generally carried in a portable binnacle. When steering by it take care that the lubber's point is in a direct line with the keel or stem and sternpost. For the benefit of the uninitiated, I will explain that the lubber's point is the black vertical line in the foreside of the compass bowl, by which the direction of the vessel's head is determined. A misplaced lubber's point is sure to cause grave errors in the course actually made. The compass should be as far removed as possible from ironwork of any kind. A spirit compass, as I have remarked elsewhere, is the only kind suitable for small craft. Those with cards of hard

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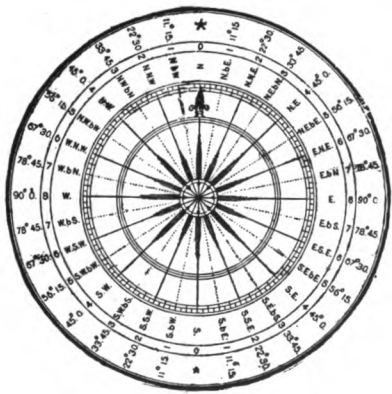
enamel, floating in undiluted alcohol, which renders freezing impossible, are the best. The amateur boat sailer should become familiar with the compass, be able to box it by both points and degrees, and to name its back bearings.



The points of the compass are thirty-two in number, as follows :

North	South-East by E.	West, South-W.
North by East	South-East	West by South
North, North-East	South-East by S.	West
North-East by N.	South, South-E.	West by North
North-East	South by East	West, North-West
North-East by E.	South	North-West by W.
East, North-East	South by West	North-West
East by North	South, South-W.	North-West by W.
East	South-West by S.	North, North-W.
East by South	South-West	North by West
East, South-East	South-West by W.	North

These points are sub-divided into quarter points, and again into degrees. The table given on pages 194-195 shows the angles which every point and quarter point of the compass makes with the meridian :

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POINTS, ANGLES AND BACK BEARINGS OF THE COMPASS.

Opposite or Back Bearings.		*Points.*	*Degrees, &c.*	*Points.*	*Opposite or Back Bearings.*	
North.	South.	0	0 0 0	0	North.	South.
		0¼	2 48 45	0¼		
N. ½ E.	S. ½ W.	0½	5 37 30	0½	N. ½ W.	S. ½ E.
		0¾	8 26 15	0¾		
N. b E.	S. b. W.	1	11 15 0	1	N. b. W.	S. b. E.
		1¼	14 3 45	1¼		
N. b. E. ½ E.	S. b. W. ½ W.	1½	16 52 30	1½	N. b. W ½ W.	S. b. E. ½ E.
		1¾	19 41 15	1¾		
N. N. E.	S. S. W.	2	22 30 0	2	N. N W.	S. S. E.
		2¼	25 18 45	2¼		
N. N. E. ½ E.	S. S. W. ½ W.	2½	28 7 30	2½	N. N. W. ½ W.	S. S. E. ½ E.
		2¾	30 56 15			
N. E. b. N.	S. W. b. S.	3	33 45 0		N. W. b. N.	S. E. b. S.
		3¼	36 33 45			
N. E. ½ N.	S. W. ½ S.	3½	39 22 30		N. W. ½ N.	S. E. ½ S.
		3¾	42 11 15			

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POINTS, ANGLES AND BACK BEARINGS OF THE COMPASS.

Opposite or Back Bearings.		*Points.*	*Degrees, &c.*	*Points.*	*Opposite or Back Bearings.*	
N. E.	S. W.	4	45 0 0		N. W.	S. E.
		4¼	47 48 45	4¼		
N. E. ½ E.	S. W. ½ W.	4½	50 37 30	4½	N. W. ½ W.	S. E. ½ E.
		4¾	53 26 15	4¾		
N. E. b. E.	S. W. b. W.	5	56 15 0	5	N. W. b. W.	S. E. b. E.
		5¼	59 3 45	5¼		
N. E. b. E ½ E.	S.W. b.W ½ W.	5½	61 52 30	5½	N.W. b.W ½ W.	S. E. b. E. ½ E.
		5¾	64 41 15	5¾		
E. N. E.	W. S. W.	6	67 30 0	6	W. N. W.	E. S. E.
		6¼	70 18 45	6¼		
E. b. N. ½ N.	W. b. S. ½ S.	6½	73 7 30	6½	W. b. N. ½ N.	E. b. S. ½ S.
		6¾	75 56 15	6¾		
E. b. N.	W. B. S.	7	78 45 0	7	W. b. N.	E. b. S.
		7¼	81 33 45	7¼		
E. ½ N.	W. ½ S.	7½	84 22 30	7½	W ½ N.	E. ½ S.
		7¾	87 11 15	7¾		
East.	West.	8	90 0 0	8	West.	East.

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The mariner's compass does not, however, give the true direction of the various points of the horizon. The needle points to the magnetic North and not to the true North, the difference between them being called the variation of the compass, which differs widely in various parts of the world, being sometimes easterly and sometimes westerly, and constantly changing. The amount is generally marked on the charts. In New York the variation for 1894 was 8° 26′ West, or three-quarters of a point to the West of the true North. Thus, to make good a true North course, the vessel would have to steer North three-quarters West. A rule easy to remember is that westerly variation is allowed to the left of the compass course, or bearing, and that easterly variation is allowed to the right of the compass course or bearing.

To convert true courses and bearings into compass courses and bearings with variation westerly, allow it to the right of the true course or bearing, and with variation easterly allow it to the left of the true course or bearing.

Deviation is another error of the compass caused by local attraction, such as the ironwork and iron ballast in a boat, or the proximity of a marlinespike to the binnacle. In a wooden boat, if proper care is taken, there should be no appreciable deviation of the compass. Deviation can be discovered by swinging the boat as she lies at her moorings, having first obtained the true magnetic bearing

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of some distant object, such as a light-house or a church steeple. As the vessel's head comes to each point of the compass, a compass bearing is taken of the object, and the difference between that bearing and the true magnetic bearing is observed and noted, and afterward tabulated. It will often be found that the deviation differs not only in amount, but in name, for different directions of the ship's head, being easterly at certain points and westerly at others.

The rule is to allow westerly deviation to the left to get the correct magnetic course, and easterly deviation to the right to get the correct magnetic course.

To find out the error of the compass in order to steer a true course, the *sum* of the deviation and the variation when both are of the same name, and their *difference* when they have different names, must be ascertained. For instance, deviation 20° West and variation 25° West, would give an error of compass 45° West, which should be applied to the left.

If the deviation was 20° East and the variation 10° West, the difference between them would be 10° East, which compass error should be applied to the right to steer a true course.

In order to find the compass course or course to steer, proceed as follows, the true course being North 40° East, the variation being 38° West and the deviation 18° East:

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Variation, 38° W., being of contrary names, take their difference.
Deviation, 18° E.

Correction, 20°, apply to the right, being westerly.
True course N. 40° E.

Compass course N. 60° E.

Another example is given where the variation and deviation are both easterly and the true course is S., 75° West.

Variation, 24° W., being of same name.
Deviation, 16° W., add together.

Correction, 40°, apply to the left, being easterly.
True course, S. 75° W.

Compass course, S. 35° W.

A volume might be written on the mariner's compass. It is a fascinating study, but unfortunately my space is limited.

There is another correction to the compass that the amateur should have cognizance of. It is called leeway, and is, in untechnical language, the drift that the ship makes sideways through the water because of the force of the wind or the impulsive heave of the sea. Some craft, because of deficiency in the element of lateral resistance, such as in the case of a shallow, "skimming-dish" sort of a boat, with the centerboard hoisted up, will go to leeward like a crab. Others of a different type, such as the "plank-on-edge" variety, with a lead mine attached, will hang on to wind-

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ward in a wonderful manner. It requires, therefore, a certain amount of judgment as well as of knowledge in this particular section of nautical lore to be able to estimate with any degree of approximate certainty the leeway a vessel may happen to make. It should not be forgotten that build has much to do with this, and that trim and draught of water are also two powerful elements in this connection. For instance, a boat with outside lead and a centerboard in a strong breeze and a lumpy sea, so long as the wind permitted her to carry a commanding spread of sail, might make no appreciable leeway, but, on the contrary, might "eat up" into the wind. But given the same boat without the lead and without the adventitious aid that the centerboard affords, she would be compelled to dowse her muslin at the first puff, and as a purely physical consequence she would retain no hold on the water and would drift off to leeward like an irresponsible she-crab.

Thus leeway must be estimated by experience. It is often a most disturbing quantity, especially when the weather is foggy and the channel in which you are steering is perplexing on account of rocks or shoals. I have already expatiated on the wisdom of anchoring in such a contingency as this whenever the elements will permit. But, of course, one is a slave of the winds and the waves, and "bringing-up" is not always possible. I should,

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therefore, advise the amateur to carefully watch his boat and endeavor to find out approximately the amount of leeway she makes when the first reef is taken in by comparing the direction of the fore and aft line of the boat with that of her wake. This method may also be pursued with advantage under all conditions of wind and weather, and by this means a moderately correct and very useful table may be made.

The old navigators like the Drakes and the Frobishers had this matter arranged for them, so when they sailed forth on voyages of great emprise and portent they were guided by certain tabulated formula that gave them full and implicit directions for the allowance of leeway. Thus the skipper of a ship with topgallantsails furled was told to allow one point; when under double-reefed topsails, one point and a half; when under close-reefed topsails, two points; when the topsails are furled, three points and a half; when the forecourse is furled, four points; when under the mainsail only, five points; when under the balanced mizzen or mizzen staysail, six points; and when under bare poles, seven points.

This antiquated method of computation answered very well, for those sterling and sturdy navigators of the olden times seemed to have had a rare faculty of achieving their adventurous purpose and of gaining, too, both fame and fortune. But the commander of a clipper ship, with whom I sailed as a youngster,

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undertook to demonstrate to me the absurdity of any such hard-and-fast rule. We had carried away our three topgallant masts, off Cape Agulhas, while threshing hard against a westerly gale. They were whipped out of us like pipe-stems. It took all hands a whole day to clear away the wreck. Next day the weather moderated sufficiently for us to have carried every stitch of canvas could we have set it. There were a number of vessels beating round the Cape, and all took advantage of the cessation of the gale to spread all their flying kites to the breeze. Our ship, under three topsails, inner and outer jibs, foresail, mainsail, crossjack, spanker, foretopmast, maintopmast and mizzentopmast staysails, beat all the fleet. When it came on to blow again we were the first to reef, because some of our rigging had got badly strained in the squall that took our topgallantmasts away. Still we maintained our lead, although jogging along comfortably while our opponents were driving at it, hugging their topgallantsails and with lee rails under.

"Now," said our captain, coming on the poop after he had worked up his dead reckoning at noontime, "you see all those ships dead to leeward—well they ought to be to windward of us unless all the books on navigation are wrong. I have entered in my traverse-table the courses we were supposed to have made good under the old rule, and have thus proved its falsity. The fact is the ships that were turne l out in

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the days when these nautical axioms were first propounded were built by the mile and cut off in lengths to suit. They had no shape to speak of below the water-line, and perhaps the rule applied to each alike. Times are different now, and leeway must be determined by the model of the ship."

The rule for reckoning leeway is as follows:

Wind on starboard side, allow leeway to the left.

Wind on port side, allow leeway to the right.

Or you may thus define it:

Vessel on starboard tack, allow leeway to the left.

Vessel on port tack, allow leeway to the right.

In this connection it might be well to urge the young mariner against keeping his boat all a-shiver and bucking against a head sea, and all the while sagging off bodily to leeward. It is better far to keep the wake right astern and keep way on the vessel—unless, of course, the weather is too violent.

The direction and rate of tides and currents have also to be allowed for when correcting a compass course. Thus in crossing Long Island Sound from Larchmont to Oyster Bay in thick weather, the magnetic course as given in the Government chart would have to be rectified and allowance made for the condition of the tide, whether ebb or flood, or your boat might never reach her destination.

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XVI.

CHARTS.

THERE are no better charted coasts in the world than those bounded by the North Atlantic and Pacific Oceans. The United States Navy has done and is doing magnificent hydrographic work. The charts issued by the Government are accurate, reliable, up-to-date and reasonable in price.

The top of a chart when spread out in front of you so that the reading part appears to you like the page of a book, and you can read it from left to right, is the North, the bottom is the South, the side on your right is the East, and the side on your left is the West. There are always compasses on a chart, either true or magnetic, by reference to which and with the aid of the parallel rulers the bearing of one point from another may easily be ascertained by the following method :

Lay the edge of the rulers over the two places; then slide them (preserving the direction) till the edge of one ruler is on the center of the nearest compass; when this is done read off the course indicated by the direction of the ruler.

To measure the distance between two places on the chart spread out the dividers till their points are over them, then

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apply to the graduated scale at the bottom of the chart, which will give you the required distance. This method, it should be remembered, is only accurate when applied to the large coasting charts. When measuring distances on general charts which extend across many degrees of latitude, the mean latitude of the two places must be measured from.

There are certain signs and abbreviations used on charts which are easily comprehended, such as *hrd* for hard, *rky* for rocky, etc. Lighthouses and lightships are clearly marked, and shoals, rocks and other obstructions to navigation are plainly defined. All the marginal notes on the charts should be made familiar by the navigator. I need scarcely say that charts, instruments and books of sailing instructions should be kept dry. There are cylindrical tin boxes for charts which are quite cheap, and these I recommend.

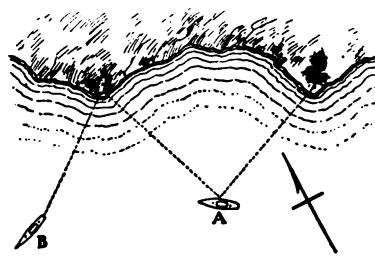

Fig. 6.

The position of a vessel may be ascertained simply and accurately by cross-bearings. Suppose you are in a ship at *a* in Fig. 6. The point with the light-

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house on it bears correct magnetic N. by W., and the point with the tree on it E. by N. You lay the parallel rules over the compass on your chart at N. by W., and work them to the lighthouse, preserving the direction. You then draw the line from the lighthouse to *a*. You then lay the parallel rules over the compass on your chart at E. by N., and work them in a similar way to the tree. Then draw the line from the tree to *a*. The spot where the two lines cut was the vessel's position on the chart when the bearings were first taken. The distance of the ship from both lighthouse and tree can be measured by taking in the dividers the distance between either and the ship, and referring to the scale on the chart.

It should be remembered that when sailing along the land cross-bearings will always determine your position, always allowing the proper corrections on the compass. In taking cross-bearings, try to have a difference between the two objects of as nearly ninety degrees as possible.

The old-fashioned log-ship and log-line for determining the distance run by a vessel need have no place in the equipment of a small yacht. There are several patent self-registering logs which record the distance run, either on the taffrail or on dials on the log itself. Their performance is fairly satisfactory, but they should be kept well oiled, and should be often exam-

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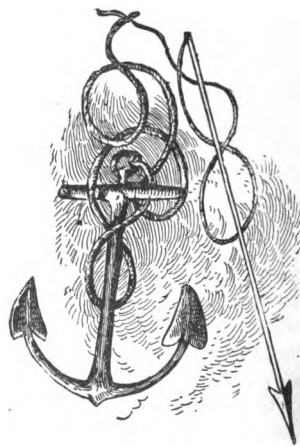
ined and tested—for instance, in a run between two objects whose distance apart is well known.

By careful attention to the Lead, the Log and the Look-out, a boat may be navigated, by dead reckoning, with a certain amount of accuracy.

A nautical mile, or knot, is the same as a geographical mile. Its length is six thousand and eighty feet. A statute mile in the United States measures five thousand two hundred and eighty feet.



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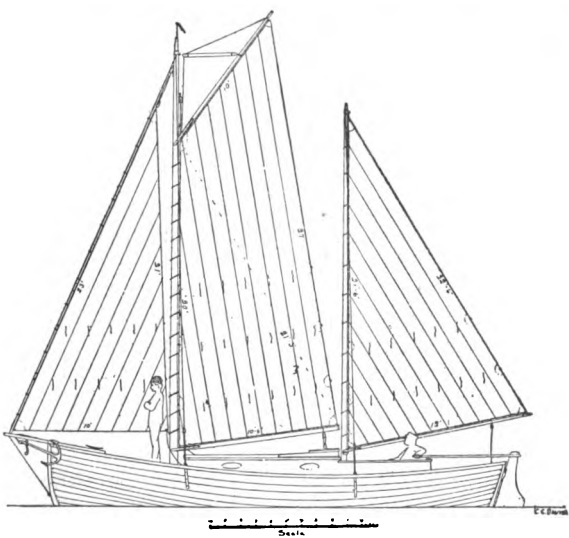
XVII.

A CHEAP AND HANDY CRAFT.

HOW A SHIP'S LONGBOAT WAS ALTERED TO A SNUG CRUISER.

WHEN I was a lad it was my good fortune to live beside an estuary of the sea, within a stone's throw of a shipyard and several boat builders' shops. Mr. Shuttleworth,



PLAN OF A 30-FOOT LIFEBOAT CONVERTED INTO A KETCH-RIGGED SAILING YACHT.

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one of the boat builders, was famous for his ship's boats, and he built from twenty to thirty in the course of a year. It was his custom to allow the skippers a small amount for each old boat he replaced, and on the beach in front of his shop were generally to be seen several longboats, jollyboats, and yacht's cutters in a more or less creditable state of repair.

One of these caught my eye, as having in her the makings of a sound seagoing craft. She was a discarded lifeboat that had long seen service on a West India passenger steamer, but had been condemned for some trifling defects as is the custom on crack liners. She was thirty feet long, seven feet wide, and four feet deep, with the usual pointed lifeboat stern. Built of teak, she was copper-fastened throughout. She looked weather beaten, it is true, and sadly needed a coat or two of paint; but when my stanch ally, Toby Page, an apprentice at the shipyard and a most ingenious craftsman withal, came to examine her he pronounced her sound as a roach. He agreed with me that, by the wise expenditure of a modest sum of money she might be converted into an able and comfortable cruiser.

Mr. Shuttleworth, approached on the subject of the boat, suggested terms quite within the modest limit of my purse, and I strode around my new pur-

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chase with all the proud airs of proprietorship.

To alter the boat into a seagoing cruiser, with the best possible accommodations compatible with her somewhat limited dimensions, was my next aim. She was to be decked, a trunk cabin fitted up, and a false keel added to give her stability and enable her to go to windward. For general handiness, I decided to rig her as a ketch. Thus there was plenty of work ahead, but, with the aid of a younger brother and the invaluable Toby Page, I felt in my bones that success was certain. The first job was to get her shored up on the beach with blocks under her keel and beneath her bilges, so that before we tackled the carpenter work we might give her hull a thorough cleaning outside and in, and then treat any leaks we might find. Our survey showed that although she would need a great many new rivets, being what is called "nail sick" in many places, her general condition was good. After scrubbing her with soap and soda we smoothed all the rough places with pumice stone. Then we filled her up to the gunwale with water, and marked every place where she leaked. Goodly streams came from many places. This, however, was to be expected owing to the craft's long exposure to all kinds of weather. We stood by her all day, pouring in an occasional bucketful to replace the water lost through leakage. We found that the

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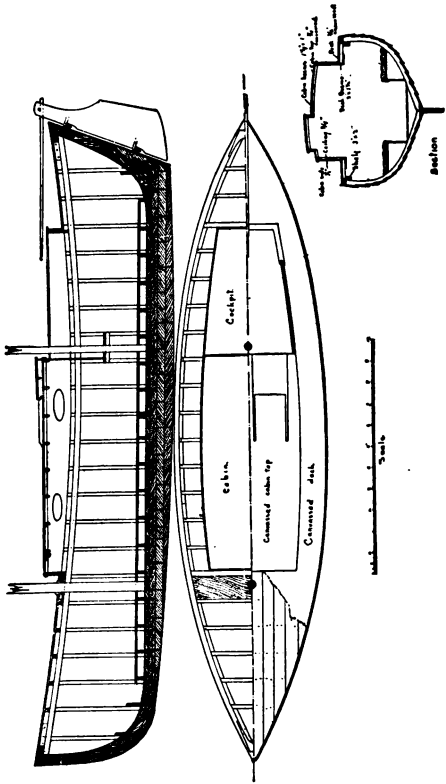
planks absorbed much moisture, the wood swelling and the leaks perceptibly diminishing as time went on.

After a couple of days we let the water out, and when she was thoroughly dry, started in to make the hull tight. Her



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frames were in capital condition. We replaced all the loose rivets with new ones of a larger size, I hardening the old ones that needed attention with a few taps of the hammer from the inside, while my mate "held" with another hammer from the outside. We were mighty particular about this process, not "scamping" the work, but tackling every rivet in the boat conscientiously, until every faulty nail was replaced. Then with a kettle of boiling North Carolina tar in which pitch had been melted in the proportion of a pound to a gallon, we painted the inside of the boat up as high as the thwarts with this boiling mixture, rubbing it well into every crevice and ledge. The hot fluid, almost as thin as water, penetrated every crack. The dry and thirsty wood absorbed a great quantity of the penetrative compound, which dried hard as good varnish, and yet from the nature of its ingredients possessed a certain amount of elasticity. All was now ready for the carpenter work. Before taking the thwarts out we nailed several boards across the boat from gunwale to gunwale, so as to keep the hull in fair shape until we could get the deck beams in position. When the thwarts were removed we prepared for action.

We had purchased the following lumber:

Deck beams—60 feet by 1½ by 2-inch oak.

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Shelf to support deck beams—Two strips of yellow pine, 33 feet long, 3 by 2 inches.

Mast thwarts—12 feet of oak plank, 1 foot wide and 1½ inches thick.

False keel—One strip of yellow pine, 26 feet long, 4 by 2 inches. Another strip of yellow pine, 21 feet long, 4 by 2 inches.

Cabin sides—Two pieces of ½-inch oak plank, 10 feet long and 14 inches wide. These for the outside sheathing. For the inside ceiling, two pieces of 1-inch pine, 10 feet long and 16 inches wide.

Fore end of cabin—One piece of ½-inch oak, 4 feet long, 8 inches wide. This for the outside. For the inside, one piece of 1-inch pine, 4 feet long by 10 inches wide.

After end of cabin—20 feet of 6-inch yellow pine.

Deck—120 feet of ¾-inch yellow pine, 6 inches wide, tongued and grooved.

Cabin deck beams—40 feet of oak, 1¼ by 1 inch.

Cabin deck—45 feet of ¾-inch pine, 6 inches wide, tongued and grooved.

Foremast—32 feet of spruce, 7 inches square.

Dandy mast—28 feet of spruce, 5 inches square.

Fore boom—10 feet 9 inches spruce, 3 inches square.

Fore gaff—10 feet 6 inches spruce, 2½ inches square.

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Dandy boom—12 feet 6 inches spruce, 2½ inches square.

We were careful that these lengths of spruce should be free from cracks and knots; this is essential if you wish to whittle out a spar from the log with satisfaction and credit to yourself.

A careful and intelligent study of the plan shows every detail of the work. First, the shelf for the support of the deck beams was cut and secured on each side. The deck beams were cut with a slight crown, or curve, so as to give the water no chance to remain on deck. The mast thwarts and stringers were put in place after the deck beams. Next the deck was laid, being first planed perfectly smooth; galvanized wire nails being used for securing the tongued and grooved planks to the beams. Then we turned the boat bottom up and bolted on the two strips of the false keel, as shown in the plan. Then we righted her and went to work on the cabin, details of whose construction are clearly given in the drawings, which, it is necessary to observe, should be exactly followed.

The canvas used for covering the house and deck was number ten duck. The woodwork to be covered was given a generous coat of thick white lead paint mixed with equal parts of boiled linseed oil and spar varnish, the duck being stretched over it while the paint was still wet. This work required great care to

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make a neat and workmanlike job. The duck had to be well stretched and nailed down with copper tacks, for no others are satisfactory. When nailed down, we dampened the duck with salt water, which caused it to shrink a little and made a tighter fit. Then we painted with the same sort of mixture used on the woodwork before the duck got dry again, and the result was satisfactory.

The interior of a boat thus altered may be fitted up to suit the taste of the owner. I should advise the use of enamel paint inside, because it is so easily cleaned and always looks well. In the little cabin there is ample room for two to sleep and live comfortably. As for the accommodation in my own little boat, a yachting sybarite would doubtless have turned up his nose at the plain and unpretentious contrivances for comfort; but the interior suited me and my shipmate exactly.

We made the cockpit floor watertight with canvas; we did our cooking with an oil stove, which was unsatisfactory, the wickless, gas-generating variety not having been invented at that time.

The problem of ballast troubled me for a time. A cast-iron shoe bolted to the keel was my first idea, but as that would have been rather costly, and would be a fixed weight, too heavy for me and my chums to tackle when hauling the boat on the beach for the winter, or for cleaning and painting, I decided on inside bal-

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last entirely. Pieces of old pig-iron, with the rust scraped off and covered with several coats of coal tar, applied boiling hot, were used; clean gravel, in bags made of old canvas of suitable size for compact storage, was also utilized. I do not recall the exact weight I put in the boat, but I remember that it took a long time to get her in trim to sail her fastest. I never regretted having no outside ballast, for the boat, with the weight properly distributed inside her hull, rode the waves as easy as an old shoe, without any laboring or straining, as is usually the case with all the ballast in one piece and bolted to the keel. We stowed it away so ingeniously and snugly, in sizes to fit, that it was neither unsightly nor inconvenient, the greater part being beneath the cabin floor and in the run. All of it was stowed so that it rested on the ribs of the boat and not on the planking.

The ketch rig, being so handy, I chose in preference to that of the yawl. I also chose to have the dandy, or jigger, cut like a leg-of-mutton sail, jig-headed, and thus without a gaff; let go the halyards, and it is the easiest sail to muzzle known to mariners. After we came to try the craft we found she would work under mainsail alone, or with foresail and jigger. The mainsail was very easy to reef, being all inboard. The stump bowsprit, with a sheave in it for the rope which held the anchor, we found a great conve-

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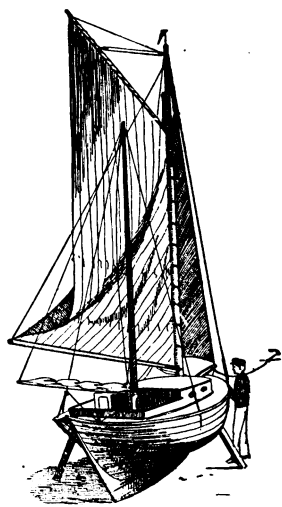
nience. Two single shrouds and a forestay of steel wire three-quarters of an inch in circumference, each with an eyesplice to go over the mast head, were used on the fore, and shrouds of the same size supported the dandy mast. There were eyebolts through the foremast head for the throat and peak halyard blocks. All the blocks used were three and one-half inch, with patent sheaves, and all the rope for halyards was twelve thread manila. The sails were of light duck. The rudder was of oak, the tiller of ash.

Such a boat, judiciously handled, will ride out a heavy gale.



THE CRUISER COMPLETE.

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XVIII.

MARLINESPIKE SEAMANSHIP.

WITH INSTRUCTIONS FOR MAKING SPLICES, KNOTS AND BENDS.

MARLINESPIKE.

THE amateur yachtsman should be able to make all the splices and most of the knots in common use. This knowledge will come in quite handy when fitting out his craft in the spring, and will save him the expense of hiring a sailor to do the work. I have spent many happy hours in rigging a fifteen-ton cutter, doing all the work myself (except stepping the mast) with the aid of a boy.

A few fathoms of rope, a marlinespike, a knife, a small pot of grease, a ball of spun yarn, another of marline and one of roping twine, and you are equipped for work. Splicing ropes and making fancy knots may be made a quite pleasant way of spending a winter's evening. It keeps one out of mischief, and the art once learned is rarely forgotten. I think if you follow my directions and take heed of the diagrams that accompany them (which I have taken pains to make as clear as possible) you will have no difficulty in becoming quite expert in the use of a marlinespike.

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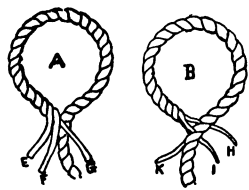
The ends of all ropes, whether belonging to the running or standing rigging, must be whipped with tarred roping twine or they will unravel. Take the rope in your left hand and lap the twine round it very tight a dozen times, taking care that the end lies under the first turns so as to secure it. Then make a loop with the twine and continue the lapping for four turns round the rope and the end of the twine, as shown above. Haul taut and cut off the end.



Eye Splice—Unlay the rope and lay the strands E, F, G at the proper distance upon the standing part, as shown at A. Now push the strand H through the strand next to it, as shown in B, having first opened it with a marlinespike. Strand I is then thrust over the part through which H was passed. Strand K is thrust through the third on the other side. Repeat the process with each strand, and then hammer the splice into shape with the butt of the marlinespike. Stretch and cut off the ends of the strands. If particular neatness is required, the strands, after having been passed through the standing part the first time, should be halved and passed again, and then still further tapered by being quartered before being passed

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for the third and last time. An eye splice is useful. Standing rigging should have eyes spliced in to go over the mast-head, and for dead-eyes to be turned in, etc.

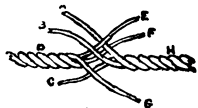

FIG. 1.

FIG. 2.

SHORT SPLICE—Unlay the ends of two ropes of the same size and bring their ends together, as shown in Fig. 1. Hold the rope D and the strands A, B and C in the left hand. Pass the strand **E** over A and under C of rope H and haul taut. Pass strand G over B and under A. Pass strand F over the strand next to it and under the second. Turn the rope round and treat the other side in the same way, when the splice will be like Fig. 2. The single tucking of the strands will not, however, be strong enough, and the process should be repeated on both sides, halving the strands for the sake of neatness. This splice is used only for rope that is not required to run through a block.

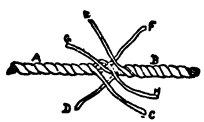

Fig. 1.

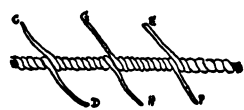

Fig. 2.

LONG SPLICE—Unlay the ends of the two ropes that are to be joined some two or three feet, according to the size

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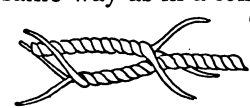
of the rope. Place the two ends together, as shown in Fig. 1. Unlay strand C and lead it back to A; then take D and lay it up in the space left by C. Do this with the strands E and F on the opposite side. The rope will now look like Fig. 2. Give the two middle strands, G and H, a lick of tar if the rope is of hemp, and grease if of manilla, and knot them together with an overhand knot, taking care that the knot is so formed as to follow the lay of the rope. Then halve these strands and pass them over one strand and under two. Treat the remaining strands in the same way, after which stretch the rope well and cut off the ends of the strands. A long splice is the neatest way there is of putting two ends of a rope together. If well made it does not increase the diameter of the rope, and therefore renders through blocks as though it did not exist. If one strand of a rope is chafed through while the other two are sound, a new strand may be put in to replace it, and the ends may be finished off in the same way as in a long splice.



CUT SPLICE—A cut splice is made the same as an eye splice, only with two ropes instead of one.

OVERHAND KNOT—It is used at the ends of ropes to prevent them from unreeving. There should always be one in the end of the mainsheet, which

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is difficult to reeve again in anything like a breeze.

REEF KNOT—It is always used to tie the reef points of a sail. First make an overhand knot and then pass the ends so that they take the same lay as the crossed parts of the overhand knot. If passed the other way, the knot will form what sailors call a granny, which will slip when it is subjected to a strain.

BOWLINE KNOT—Take the end (1) of the rope in the right hand and the standing part (2) in the left hand. Lay the end over the standing part and turn the left wrist so that the standing part forms a loop (4) enclosing the end. Next lead the end back of the standing part and above the loop, and bring the end down through the loop as shown. This is a very useful knot.

RUNNING BOWLINE—It is made by passing the end of a rope round its standing part and forming a bowline as in Fig. 8.

BOWLINE ON A BIGHT—To make it, double the rope and take the doubled end (1) in the right hand, the standing part (2) of the rope in the left hand. Lay the end over the standing part, and by turning the left wrist form a loop (3) having the end

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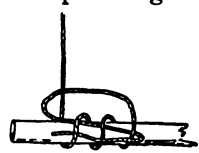
inside. Next pull up enough of the end (1) to dip under the bight (4), bringing the end towards the right and dipping it under the bight, then passing it up to the left over the loop and hauling taut.

TWO HALF HITCHES—Pass the end of the rope round the standing part and bring it up through the bight. This makes a half hitch. Repeat the process and haul taut. If the knot is to bear a great strain, seize the end back with spunyarn to the standing part.

TIMBER HITCH—Pass the end of a rope round the spar, then round the standing part *b*, then several times round its own part *c* against the lay of the rope.



GAFF TOPSAIL HALYARD BEND—Pass two turns round the spar, then lead the end back round the standing part and underneath all the turns, bringing it round to its own part and back again over the two outer turns and underneath the inner turn.

BLACKWALL HITCH—It is the simplest method known of making fast the end of a rope to the hook of a tackle. The figure is self-explanatory, the underneath part of the rope being jammed hard and fast by the strain on the hook.

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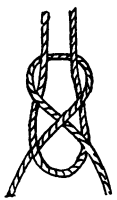
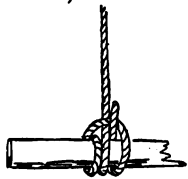


COMMON BEND—Make a bight with the end of one rope, and pass the end of the other through the bight from beneath, and round both parts with the end under its own standing part. The greater the strain, the faster will this bend jam.



MAGNUS HITCH—Pass two round turns with the end of a rope over a spar, then take it before the standing part, pass it again under the spar and up through the bight.

SELVAGEE STROP—It is made by driving two nails into a length of plank at a distance apart equal to the desired length of the strop. Make fast one end of a ball of spunyarn or knotted ropeyarns to one of the nails and pass it round the other, continuing the process until the strop is as thick as required. Marl it down with spunyarn and sew canvas or leather round it if intended for a block.

GROMMET STROP—It is made of a single strand of rope. To make it, lay one end over the other at the size required, and with the long end follow the lay round until a ring is formed with three parts of the strand all round. Finish by di-

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viding the ends, overhand knotting, and passing them over one strand and under the other exactly as in a long splice. To make a neat job, use a strand from rope that has been some time in use and is well stretched. The strand should be about a foot more than three times the length of the strop, to allow for the knotting. It may be wormed and covered with canvas or leather if intended for a block.

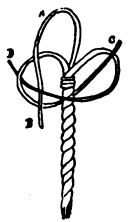

Fig. 19.

Fig. 20.

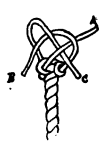

Fig 21.

Fig. 22.

Figs. 19 and 20 show a Wall Knot. Unlay the end of a rope and with the strand A in Fig. 19 form a bight, hold it down at the side B, pass the end of the next strand C, round A, the end of strand D round C and through the bight of A. Haul taut and the knot is made as in Fig. 20. This can be crowned by taking strand in Fig. 21 and laying it over the top of the knot. Then lay B over A, and C over B and through the bight of A and haul taut. Fig. 22 shows a double wall and double crown, which is made by letting the ends follow their own parts round until all the parts appear double, first walling and then crowning.

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MATTHEW WALKER KNOT—Made by unlaying the end of a rope and taking the end A round the rope and through its own bight, the strand B underneath through the bight of A, and the strand C underneath through the bights of strands A and B, and hauling all the strands taut. This knot is used principally for the ends of lanyards. In making these knots a whipping of sailmaker's twine should be put round the rope where the knot is to be when formed.

This illustration shows the process of worming a rope, which consists of winding spunyarn of suitable size into the space between the strands with the lay of the rope, so as to make the rope smooth for parcelling. This must be done with the rope on the stretch. A shows the spunyarn.

This illustration shows the process of parcelling and serving. After the worming is finished wrap narrow strips of canvas—tarred, if the rope is of hemp, and painted if it is of wire—round the rope with the lay, secure the parcelling to the rope by marling it with twine, the rope can then be served against the lay. Lay the serving mallet B with its groove on the

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rope. Take a turn with the spunyarn round the rope and head of the mallet, round the side next you, and two turns on the other side and twist it round the handle. Get an assistant to pass the ball A round the rope while you heave round the mallet. The last half-dozen turns of the service must have the end of the spunyarn put through them and hauled taut to secure it.

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XIX.

WEATHER "WRINKLES."

THE boat sailer or yachtsman should be able, from close observation of the barometer and the general appearance of the sky, to foretell the weather with a certain degree of accuracy. The aneroid barometer is peculiarly sensitive to all atmospheric changes, and is thus invaluable for meteorological forecasts. A regular code of phenomena has been formulated by meteorologists, from which I take the following:

A rapid rise indicates unsettled weather.

A gradual rise indicates settled weather.

A rise with dry air and cold increasing in summer indicates wind from the northward, and if rain has fallen better weather may be expected.

A rise with moist air and a low temperature indicates a continuance of fine weather.

A rapid fall indicates stormy weather.

A rapid fall with westerly wind indicates stormy weather from northward.

A fall with northerly wind indicates storm with rain and hail in summer and snow in winter.

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A fall with increased moisture in the air and increasing heat indicates southerly wind and rain.

A fall after very calm and warm weather indicates rain and squalls.

The barometer rises for a northerly wind, including from northwest by north to the eastward, for dry or less wet weather, for less wind, or for more than one of these changes, except on a few occasions when rain, hail or snow comes from the northward with strong wind.

The barometer falls for a southerly wind, including from southeast by south to the westward, for wet weather, for stronger wind, or for more than one of these changes, except on a few occasions, when moderate wind, with rain or snow, comes from the northward.

A fall, with a south wind, precedes rain.

A sudden and considerable fall, with the wind due west, presages a violent storm from the north or northwest, during which the glass will rise to its former height.

A steady and considerable fall of the barometer during an east wind indicates a shift of wind to the southward, unless a heavy fall of snow or rain immediately follows.

A falling barometer, with the wind at north, brings bad weather; in summer rain and gales; in spring snows and frosts.

If, after a storm of wind and rain, the barometer remains steady at the point to which it had fallen, severe weather

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may follow without a change in the wind. But on the rising of the barometer a change of wind may be looked for.

The following rhymes are familiar to most sailors:

When the glass falls low,
Look out for a blow.

First rise after low,
Portends a stronger blow.

When the glass is high,
Let all your kites fly.

Long foretold—long last;
Short notice—soon past.

The following notes may be relied on for forecasting the weather:

Red sky at sunset, fine weather.
Red sky in the morning, wind or rain, and often both.
Gray sky in the morning, fine weather.
Hard, oily looking clouds, strong wind.
Yellowish green clouds, wind and rain.
Bright yellow sky at sunset, wind.
Pale yellow sky at sunset, rain.
Very clear atmosphere near the horizon is a sign of more wind and often rain.

Here follow some old sailors' jingles which I heard when a boy in the forecastle:

When rain comes before the wind,
Sheets and halyards you must mind;
When wind comes before the rain,
Hoist your topsails up again.

Evening red and morning gray
Are sure signs of a fine day;
But evening gray and morning red,
Makes a sailor shake his head.

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Amateurs while on a cruise should frequently look at the barometer and take notes of its height and enter them in the log.

The action of the aneroid barometer depends on the effect produced by the pressure of the atmosphere on a circular metallic chamber partially exhausted of air and hermetically sealed. This kind of barometer is liable to changes on account of its mechanism getting out of order, and it should be often compared with a mercurial barometer, which from its cumbersomeness cannot be conveniently carried in a small craft. Aneroid barometers of excellent quality, and of about the size of an ordinary watch, are offered for sale at a reasonable price, and a cruise should not be undertaken without one.

A phosphorescent sea is a certain sign of continuance of fine weather.

When porpoises come into shallow water and ascend the river stormy weather is near.

Sea birds fly far out to sea in fine weather, but if they fly inland bad weather may be expected.

A halo round the moon, especially if it appears distant and yet very distinct, indicates a gale of wind and probably rain.

When the wind changes it usually shifts with the sun from left to right. Thus an East wind shifts to West by way of Southeast, South and Southwest, and a West wind shifts to East by way of Northwest, North and Northeast. If

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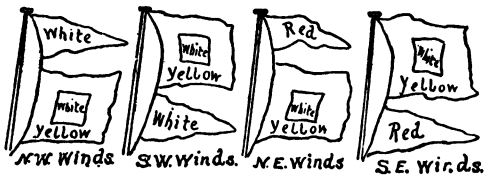
the wind shifts the opposite way it is said to "back," but this it rarely does except in unsettled weather.

The United States Signal Service has a local observer stationed at each of the principal ports. When the "information signal," which consists of a red pennant, is displayed, it indicates that information has been received from the central office of a storm covering a limited area, dangerous only for vessels about to sail to certain points. Shipmasters and others interested will be supplied with the necessary information on application.

A cautionary signal, which is a Yellow Flag with a white center, indicates that the winds expected are not so violent that well found and seaworthy vessels cannot encounter them without great danger. A cautionary flag hoisted alone signifies that the direction of the expected wind is doubtful.



CAUTIONARY SIGNALS.

A dangerous storm signal, which is a Red Square Flag with black center, is hoisted when the wind is over thirty-five miles an hour.

At night a Red Light indicates East-

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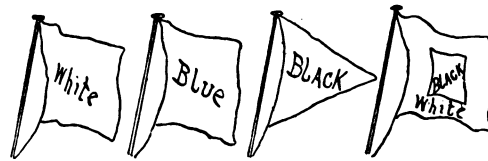
erly winds, and a Red and White Light Westerly winds.

STORM SIGNALS.

Following are the weather signals, which explain themselves:



CLEAR OR FAIR WEATHER. LOCAL RAIN OR SNOW. TEMPERATURE SIGNAL. COLD WAVE.

Beaufort's scale is used to measure the velocity of the wind. It is given below:

Hourly Velocity in Miles.	*Scale.*	*State.*
	0	calm.
1	1	light airs.
2 to 3	2	light breezes.
4 to 7	3	gentle breeze.
9 to 15	4	moderate breeze.
15 to 18	5	fresh breeze.
19 to 22	6	strong breeze.
23 to 28	7	moderate gale.
28 to 40	8	fresh gale.
40 to 48	9	strong gale.
48 to 56	10	whole gale.
57 to 80	11	storm.
80 to 100	12	hurricane.

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XX.

SEA COOKERY FOR YACHTSMEN.

THOSE who go a-sailing for pleasure in small craft, frequently suffer hardships, or at least inconvenience, in the way of meals, because of their lack of knowledge of the provisions to take with them, and of simple methods of preparing wholesome and appetizing dishes.

Sea cooking differs materially from shore cooking, inasmuch as the stove in a house is erected on a floor that is both stationary and stable. The yachtsman

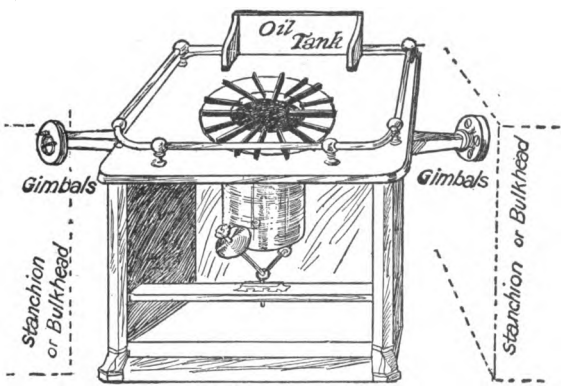

Fig. 1. A Yachtsman's Stove.

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who has a cosy galley with a fixed stove that burn coal or coke or charcoal, and that draws well, has reason to bless his fortunate stars.

There have now come into vogue several varieties of the blue-flame wickless cooking stove. In the accompanying illustration, Fig. 1, I have depicted a stove which I have found to suit. It is wickless and burns the ordinary kerosene oil. To suit sea conditions the stove is slung on gimbals like a ship's compass, so as to yield to every motion of the vessel. The railing round the top prevents pots and pans from sliding to leeward. Fig. 2 shows the finest fry-pan ever invented for an oil stove, on which broiling is impracticable. It acts as a broiler or fryer at will. The raised bars prevent the steak or cutlet from being soddened with fat, the result being equal or nearly equal to a gridiron. If frying is required put the necessary quantity of oil, butter or fat in the pan. Let it come to a boil, and then immerse in it the article, fish, flesh, fowl, reptile, or vegetable that you wish to cook.

With a stove having only one lid or burner the sea-cook might often have some difficulty in keeping three utensils on the boil at once. Luckily ingenuity has surmounted the obstacle, and Fig. 3 shows three stew-pans of small size that will fit over the burner of the stove shown in Fig. 1. They are in the market, but it took me a long time to find out where they are for sale. In one

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you may cook curry, in the second rice, while clam broth may simmer in the third. In good sooth a very cerberus of stew-pans!

Some sort of a contrivance for storing ice so as to keep it solid as long as possible is indispensable. Such a device is shown in Fig. 4.

For sea picnics buy as many of the thin wooden plates (costing only a trifle) as you may require. These after being used may be thrown overboard. Take no crockery ware or china to sea in a small boat. Cups, saucers, plates and dishes can be obtained made of enameled steel. These are unbreakable and cleanly. Stew-pans, kettles, pitchers, coffee-pots and fry-pans are also made of enameled steel, and they cannot be surpassed. Cooks' furnishings depend on the size of the boat and the hands she carries. I suggest the following, but leave the sizes to the discretion of the purchaser who knows about how many mouths he has to feed: One kettle for boiling water for tea or coffee, one deep fry-pan, one iron pot with tight-fitting cover for boiling meat, fish or cooking chowder, one teapot, one coffee-pot,

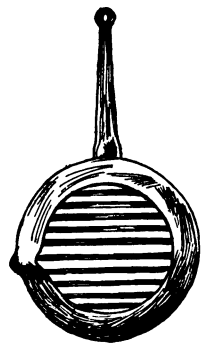

Fig. 2.
The Ideal Fry-Pan.

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a soup ladle, a long iron two-pronged fork (known aboard ship as the cook's tormentors), two stew-pans for cooking vegetables, one broiler (if the implement can be used), one cook's knife, one vegetable knife, one swab for washing pots, pans and plates, and dish towels for drying them, soap, cups, plates, dishes, knives, forks, spoons, glasses, *quant. suff.* Do not forget a galvanized iron bucket for the cook, a can opener and a corkscrew. Also matches in an airtight can or glass. Fuel in either fluid or solid shape should not be omitted.

When we come to the question of the food supplies to be taken aboard, much will depend upon the individual. Hard tack, soft tack, flour, beans, corned beef, salt pork, bacon, hams, canned meats, sardines, canned fruits and vegetables, cornmeal, lard, butter, cheese, condensed milk, sweetened and unsweetened, coffee, tea, cocoa, chocolate, pepper, salt, mustard, vinegar, poultry seasoning, sugar and rice are some of the staple comestibles that suggest themselves, but these may be added to or subtracted from according to circumstances.

A ham is one of the most easily procured comestibles. Pick out a small one, not too fat. If you want it tough as leather, boil it furiously for a couple of hours, then haul it out of the pot and eat it. If you want a delicate, tender and juicy ham soak it in a bucket of fresh water for twelve hours. Then scrape it well and pop it into a big pot full of cold fresh water. Let it come slowly to

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the boil. As soon as the water reaches the boiling stage, regulate the heat so that a gentle simmering, the faintest possible ebullition is kept up for five or six hours, according to the size of the joint. Then take it out of the pot and skin it. The rind will come off as easily as an old shoe. Then return meat to the water in which it was boiled and let it remain until it is quite cold. Next dish it, drain it and put it in the ice box to

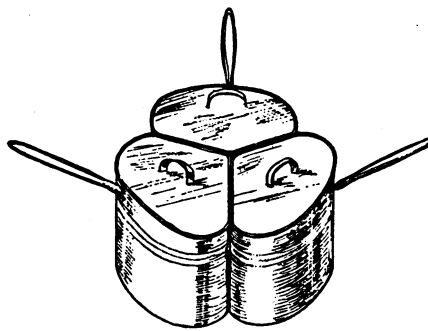

Fig. 3. A Nest of Stew-pans.

harden. Cut in very thin slices with a sharp knife, and you will admit that cooked after this scientific formula ham is mighty fine eating.

Corned beef cooked after this same fashion will also be a success. The secret is a simple one of chemistry. Hard boiling hardens the fibers and tears the meat to rags. Gentle simmering softens the meat while allowing it to retain its juices.

The navy bean at present in use,

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though much may be said in its praise, is far inferior to the lima bean. This legume if substituted for the insignificant (by comparison only) little bean on which Boston breakfasts every Sabbath morn will be found so palatable that the lesser variety will never again be used. Procure a quart of lima beans. Pick out all that are shriveled or discolored. Soak the rest all night in plenty of cold fresh water and in the morning you will find them plump and tender. Wash them well and place them in a pot on the fire with a square piece of salt pork weighing three-quarters of a pound; simmer them gently till they are tender, but not till they reach the porridge stage. On the contrary, let each bean be separate like the soft and swelling grains of well-cooked rice. Strain through a colander, saving a pint of the water in which they were boiled. Pack in the bean pot. Bury the chunk of pork in the beans. Season the pint of water reserved as mentioned above, to your liking. Pour over the beans in the pot and put in the oven to bake. The flavoring of beans depends upon the taste of the cook.

Sirloin steaks are a good staple viand. Make the butcher cut them not less than two inches thick. If you cannot grill them heat your fry-pan almost red-hot. Put no fat in the pan. Place your steak cut into convenient chunks into the hot pan. Let one side sear for a minute or so to keep in the juices. Then turn meat over. It will be cooked sufficiently for

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most palates in five or six minutes. Place on a piping hot platter, spread some fresh butter on the steak, sprinkle with pepper, and pipe to grub. Chops may be cooked in the same way.

Meat may be roasted in an iron pot if the cook has no oven. Moderate heat, continuous care to prevent burning, and frequent basting are the three requisites of a successful pot roast.

So far as beverages are concerned, useful hints in that direction are given in Fig. 5, which shows a picturesque and shipshape vessel to carry when a-cruising.

Fig. 4. Ice Tub.

There is no daintier dish than a fresh, fat lobster, generous and juicy, just hauled from the pot in which he was caught. Pick out a particularly lively specimen of medium size but heavy. The cock lobster may be distinguished from the hen by the narrowness of the tail, the upper two fins of which are stiff and hard, while the tail of the hen is broader and the fins soft. The male has the higher flavor; the flesh, too, is firmer and the color when boiled is a deeper red. The hen is well adapted for lobster *a la* Newburg, but

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for eating on the half-shell a male in prime condition is far preferable.

The secret of cooking lobsters is to plunge them into a pot of furiously boiling sea water, and to keep the water in a condition of fast ebullition for just twenty minutes. Fresh water to which salt is added will not do so well. Salt water fresh from the ocean is indispensable. It brings out the correct flavor and imparts an indefinable zest to the lobster. Hard-shell crabs may be boiled in the same way, but ten minutes will be ample time.

All fresh vegetables are, in the opinion of the writer, improved in flavor by cooking them in sea water fresh from the ocean, not from a harbor contaminated by noxious influences from the shore. All vegetables should be immersed in boiling water and cooked till done. Potatoes will take about half an hour to boil, but cabbages, carrots and turnips much longer. I should not advise the cooking of the last-named three esculents aboard a small craft. Canned asparagus, French peas and string beans take little time to prepare and are excellent if a reliable brand is purchased. Open the can, drain off the liquid and throw it away. Wash the vegetables, strain the water off, place in a stew-pan with a lump of butter, and heat thoroughly. The liquid of canned vegetables is unfit for human food.

Hard clams or quahaugs are plentiful at any port during the boating season. The recuperative qualities of the

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small variety served ice-cold on the half shell with a dash of Tabasco sauce and no other seasoning are beyond praise. Now while the little clam is excellent eating just as soon as opened from the shell, taking care to waste none of his precious juices, his elder brother also has inestimable gastronomic values.

The easiest and simplest method of preparing clam broth is to scrub the clams well and wash them in several waters. Put them in an iron pot, without any water or liquid. Let them remain on the fire for twenty minutes. Then strain the juice, into which put a little fresh butter, a small quantity of milk, and a dash of red pepper. Drink while hot.

Fig. 5. A Traveling Companion.

Never add water to clam broth, and never let it boil after the milk is added, as it will curdle nine times out of ten.

To make clam soup, clean the clams as for broth. Place them in an iron

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pot on the stove. As soon as they open take them out of their shells and chop very fine. A hardwood bowl and a two-bladed chopping knife are the best apparatus for this job. Strain the clam liquor, return to the pot, add minced onions to taste and the chopped clams; simmer gently for one hour, thicken to taste with cracker dust, season with sweet herbs and pepper; let boil fast for ten minutes, take off the stove and add some hot milk and a lump of fresh butter. Serve.

Clam chowder is an old sea dish whose popularity seems likely never to wane. It is a simple dish to prepare, although many cooks make a mystery of it. Cut half a pound of streaky salt pork into small cubes. Fry in an iron pot together with half a dozen medium-sized sliced onions until they are light brown. Chop fifty hard-shell clams fine. Peel and slice thin a dozen large raw potatoes. Break up four sea biscuits and soak till soft in cold water or milk. Scald and peel and slice six ripe and juicy tomatoes. Put these ingredients into the pot in layers, pour over them the strained juice of the clams. Season with red and black pepper, sauces and herbs to taste. Cover an inch with hot fresh water and simmer for three hours. A pint of sour California claret added just before serving is an improvement. An old hen makes tip-top chowder cooked in the same fashion.

Fish chowder may be prepared in a

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similar way. Cod, haddock, sea bass and bluefish are good made into a chowder.

The soft-shell clam makes a delicate stew or broth. The tough parts should be rejected from the chopping bowl. Boiled for twenty minutes and eaten from the shell with a little butter and pepper they are also very appetizing. A big potful soon disappears.

There is no excuse for the yachtsman neglecting to enjoy the delights of fish fresh from the sea. Fishing tackle should always be carried. Bluefish and mackerel may be caught by trolling; and if you have fisherman's luck, once in a blue moon a Spanish mackerel may fall to your lot. If so, that day must be marked by a white stone, for a Spanish mackerel transferred in about two shakes of a lamb's tail from the fish-hook to the fry-pan, or better still, if your arrangements permit, to the gridiron or broiler, is good enough for the gods to feed on. Two axioms should be borne in mind, namely, to fry in plenty of boiling fat or to plunge into boiling water. Never humiliate a fish by placing him in a cold fry-pan or into a cooking pot of cold water.

Before frying fish dip in well-beaten egg and then sprinkle with bread crumbs or cracker dust, dip in egg again, and then add more bread crumbs or cracker dust. This is for epicures. For ordinary seafarers if the fish is rolled in yellow cornmeal without the egg the result will be nearly the same.

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Cut up large fish into suitable sizes, but fry small fish whole.

Soft-shell crabs should be cooked in boiling fat. When brown they are done. Ten minutes is usually enough to cook them thoroughly.

Always when you boil fish of any kind indigenous to salt water or fresh put them in boiling water either from the sea or fresh water well salted. A little vinegar added is good. A two-pound fish should cook sufficiently in fifteen or at most twenty minutes. Fish with white flesh take longer to boil than those with dark.

An excellent sauce for boiled fish may be made thus: Put a piece of butter as big as an egg in a saucepan or a tomato can; heat till it bubbles, add a heaping tablespoonful of flour, stir till quite smooth; pour slowly into this, stirring continually, a pint of the water the fish was cooked in, and add two hard-boiled eggs chopped fine. This may be flavored with anchovy sauce or a few drops of Harvey or Worcestershire. Some prefer the addition of a little lemon juice or even vinegar. Every man to his taste!

When a very little boy I sailed in the *Derwent*, a small schooner engaged in carying bottles from Sunderland to London. The bottles were taken in from the factory where they were made, stowed in the hold of the schooner and transported to a wharf at Wapping. Bottles are a clean kind of freight, and our skipper being a very

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particular kind of a man the *Derwent* was kept as bright as a new pin outside and inside, alow and aloft. On this dashing little vessel I was cook and cabin boy. There was no regular galley on deck, simply an iron cooking stove erected on the foreside of the mainmast; and on that in storm and calm I boiled and baked for a crew of four for more than a year—in fact till I quit the coasting trade and signed away foreign. My skipper took me under his special guidance. The grub had to be well cooked and the deck kept spotless or I used to suffer. Skipper and mate were epicures after a fashion, so I had to keep my weather eye open.

My experience in merchant vessels and pleasure craft has fitted me to write with some small assumption of authority on the subject of sea cooking.

Some of my methods may seem queer and perhaps grotesque, but condemn them not till you have tested them in the crucible of experiment.

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XXI.

NAUTICAL TERMS IN COMMON USE.

Aback—A sail's condition when the sheet is to windward and it drives the vessel astern.

Abaft—The position toward the stern of any object or point such as "abaft the mast" or "abaft the binnacle."

Afore—The contrary of abaft.

Ahoy !—An interjection used in hailing a vessel, such as "*Vigilant* ahoy !"

Athwart—Across the keel.

Atrip—When the anchor is broken out of the ground.

Avast—Stop, discontinue. As "avast hauling" (stop hauling).

Balance reef—A diagonal reef in a fore-and-aft sail extending from throat to clew.

Batten down—Covering hatches with tarpaulins and securing them with battens.

Beam ends—A vessel is said to be on her beam ends when knocked down by a squall to an angle of about 45 degrees.

Belay—To make fast a rope or fall of a tackle.

Below—Greenhorns call it "downstairs" and seamen laugh at them.

Bight—A loop of a rope.

Bilge—The round in a vessel's timbers where they turn from her sides toward the keel.

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Binnacle—A case in which the compass is contained.

Block and block—When the blocks of a tackle are hauled close together.

Bolt rope—The rope sewn round the edges of sails. It is made of the best hemp.

Bonnet—An extra piece of canvas laced to the foot of a jib or foresail, taken off when it blows hard.

Box the compass—To call over the points of the compass in correct order.

Break off—When a vessel sailing close-hauled is headed by the wind and is unable to lay the course she was steering.

Bring up—To anchor.

Broach to—To come to against wind and helm.

Capsize—To turn over.

Carvel built—Constructed with the planks flush edge to edge and the seams caulked and payed.

Caulking—Driving oakum into the seams of a vessel with a mallet and a blunt chisel called a caulking iron.

Clews—The lower corners of square sails; the lower after-corners of fore-and-aft sails.

Clinch—To fasten a rope by a half hitch and then seize the end back to the standing part.

Close-hauled—Hauled as close to the wind as the sails will permit without shaking their luffs. A cutter-rigged yacht with well-cut canvas should lie within four and a quarter points of the wind. Some modern racing craft have

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done half a point better than this. Square-rigged vessels cannot head better than five and a-half points of the wind.

Collar—An eye spliced in a shroud or stay to go over the masthead.

Comber—A big wave.

Companion—The entrance from the deck to the cabin below.

Compass bowl—The bowl in the binnacle that contains the compass.

Corinthian—A term in yachting possessing the same significance as amateur; the opposite of professional.

Counter—That part of a vessel which projects abaft the sternpost.

Covering board—The outside deck plank fitted over the timber heads. The same as planksheer.

Cracking on—Carrying a press of sail.

Crank—Not stiff under canvas; easily heeled or listed.

Cranze or Cranse—A metal band with eyes on it fitted to the end of a bowsprit or other spar.

Cringle—A metal thimble worked in the clews and leeches of sails.

Dandy—A cutter-rigged vessel with lug-mizzen set on a jigger-mast.

Davits—Iron cranes on vessels to which boats are hoisted.

Deadeye—A circular wooden block with three holes in it without sheaves, through which a lanyard is rove to set up standing rigging.

Dead wood—Solid wood worked on top of the keel forward and aft.

Depth of hold—The height between

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the keelson and the deck of a single-decked vessel.

Displacement—The quantity of water displaced by a vessel, which in weight is always equal to her own weight.

Dogvane—A light vane made of bunting or feathers to show the direction of the wind.

Dowse—To lower a sail suddenly.

Down-haul—A rope by which a sail is hauled down.

Draught of water—The depth of a vessel measured from the under side of the keel to the load water-line.

Earrings—Ropes for fastening the corners of the heads of sails to yards and for reefing.

Ease off—To slacken a rope handsomely.

Eyelet holes—Small holes worked in sails for lacings or lashings to be rove through.

Eyes of the rigging—Collars spliced in the ends of shrouds to go over the masthead and also over the deadeyes.

Fair leaders—Holes in planks, etc., for ropes to be rove through so that they lead fairly.

Fair wind—A wind that permits a vessel to steer her course without tacking.

Fall—The hauling part of the rope of a tackle.

False keel—A timber bolted to the underside of the keel proper.

Fathom—A sea measure of six feet.

Fender—A species of buffer made of wood, rope or other material to hang over a vessel's side to prevent her from

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chafing against a dock, or another vessel.

Fid—An iron or wooden bar to keep bowsprits and topmasts in place; a conical wooden instrument used by riggers and sailmakers.

Fish, To—To strengthen a weak or repair a broken spar by lashing another spar or batten to it.

Flare—To project outwards; contrary to tumbling home.

Flat aft—When sheets are trimmed as close as possible for effective windward work.

Floors—The bottom timbers of a vessel.

Flowing sheet—The sheet eased off to a fair wind.

Flush decked—Having neither poop nor forecastle.

Foot—The lower edge of a sail.

Forereach—To sail faster through the water on a wind than another vessel.

Freeboard—That part of a ship's side above the water.

Full and by—To steer as close to the wind as possible, while at the same time keeping the sails full of wind.

Futtocks—The timbers which join and butt above the floors, called first, second and third futtocks.

Gammon iron—An iron hoop fitted to the side of the stem, or on top of the stem, to receive and hold the bowsprit.

Garboard—The strake of plank next above the keel, into which it is rabbeted and bolted.

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Gripe, To—A vessel gripes when she has a tendency to come up in the wind and requires much weather helm.

Gudgeons—Metal straps with eyes secured to the stern post, into which the pintles of the rudder are fitted.

Gunwale—The timber fitted over the timber heads and fastened to the top strake.

Guys—Ropes used to steady a spar or other thing.

Gybe—To let a fore-and-aft sail shift from one side to the other when running before the wind. To let a vessel go so much off the wind as to bring the wind on the opposite quarter.

Half-mast high—When a flag is hoisted halfway up as a mark of respect to a person recently dead.

Halyards—Ropes for hoisting sails.

Handsomely—Steadily; carefully.

Handy billy—A watch tackle kept on deck for getting a pull on sheets or halyards.

Hanks—Rings or hooks for fastening the luffs of sails to stays.

Hard down—The order to put the tiller a-lee. Hard up, the order to put the tiller a-weather.

Heave to—To so trim a vessel's sails that she does not move ahead.

Heel rope—The rope by which a running bowsprit is hauled out or a topmast lowered.

Hoist—The length of the luff of a fore-and-aft sail.

Horns—The projections forming the jaws of gaffs or booms.

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Hounds—The projections on a mast that support the lower cap and rigging.

House—To lower a topmast down within the cap.

Inhaul—The rope used to haul sails inboard.

In irons—The condition of a vessel head to wind and with way lost, unable to pay off on one tack or the other.

Irish pennants—Loose ropes flying in the breeze or dangling over the side.

Jackstay—A rod of iron, a wooden cleating, or a wire rope for sails or yards to travel on; also a wire rope on the main boom to which the foot of the sail is laced.

Jiggermast—The mizzenmast of a yawl or dandy.

Kentledge—Pig iron used as ballast.

Lanyards—Ropes rove through deadeyes by which shrouds or stays are set up.

Leeboard—An old-fashioned contrivance to check leeway, still in use on some Dutch vessels and English barges.

Load water-line—The line of flotation when a vessel is properly ballasted or laden.

Luff—To come closer to the wind.

Make fast—To belay a rope.

Masthead—That part of the mast above the hounds.

Mast hoops—The hoops to which the luffs of fore and aft sails are seized to secure the sails to the masts.

Miss stays, To—To fail in an attempt to tack.

Mousing—A yarn wound round a hook to prevent it from becoming unhooked.

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Near—Very close to the wind.

Nip—To nip a vessel is to sail her too close to the wind.

On a wind—Closehauled.

Outhaul—A rope or tackle by which a sail is hauled out on a spar.

Paddy's hurricane—A dead calm.

Painter—A rope spliced to a ring bolt in the bow of a boat to make fast by.

Pay—To pour hot pitch or marine glue into seams after they are caulked.

Pintles—The metal hooks by which rudders are attached to the gudgeons.

Pole mast—A mast without a topmast, but with a long masthead above the hounds.

Put about—To tack.

Raffee—A square or triangular sail set flying on the foretopmasts of schooners.

Rake—To incline forward or aft from the vertical, as raking mast, a raking sternpost, etc.

Reef band—A strip of canvas sewn across a sail, in which eyelet holes for the reef points are worked.

Reef pendant—A strong rope with a Matthew Walker knot in one end. It is passed up through a hole in the cleat on the boom, and then through the reef cringle in the sail and down through the hole in the cleat on the other side of the boom.

Reef points—Short lengths of rope in sails to tie up the part rolled up when reefing.

Reeve—To pass a rope through a block or a hole of any kind.

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Roach—The curved part of the foot of a sail.

Rockered keel—A keel whose ends curve upward.

Running bowsprit—A bowsprit so fitted as to run in or out and reef.

Serve—To cover a rope with spun-yarn.

Shake out a reef—To untie the reef points and set the sail.

Sheathing—The copper or other metal nailed on the bottom of a vessel.

Sheave—The grooved wheel in a block or in the sheave hole of a spar over which the rope passes.

Sheet—The rope by which the clew of a sail is secured.

Snotter—An eye strop used to support the heel of a sprit.

Spitfire jib—The smallest storm jib.

Taunt—Tall, high.

Taut—Tight.

Tie up—A lubber's synonym for moor. You tie up a dog. You moor a vessel.

Thimble—A heart shaped or circular ring with a groove outside for ropes to fit in. They are used for the eye splices in ropes, the straps of blocks and for the cringles in sails.

Thwarts—The transverse seats in boats.

Tumble home—When the sides of a vessel near the deck incline inward the opposite to flaring.

Tyers—Ropes that secure a mainsail when stowed.

Unbend—To cast loose a sail from stay, gaff, boom or yard.

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Veer—To pay out chain.

Wear—To bring the wind on the other side of a vessel by turning her head from the wind. The reverse of tacking.

Weather gauge—The condition of a vessel that is to windward of another.

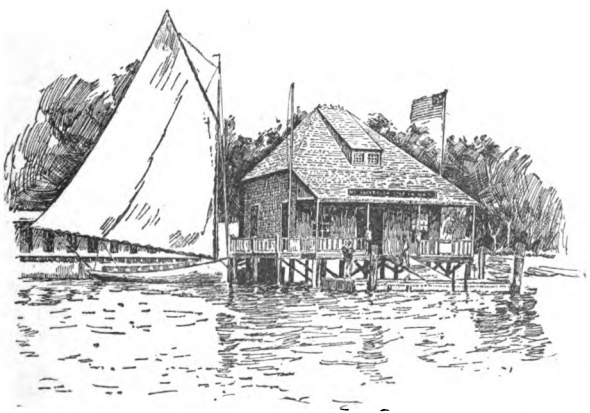
Weather helm—A vessel is said to carry weather helm when she has a tendency to fly up in the wind.

Weathering—If one vessel eats to windward of another, she is said to weather on her. Weathering an object is passing it on the windward side.

Whip, To—To bind the end of a rope with twine to prevent it from unlaying.

Yaw—A vessel yaws when her head flies from one direction to the other; as, for instance, when her helmsman is unable to keep her steady on her course.

Yawl—A cutter-rigged vessel with a mizzenmast stepped in her counter.



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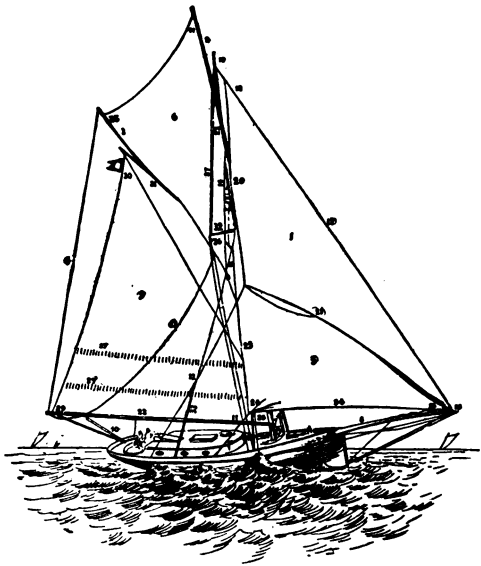

THE SLOOP YACHT.

Names of Spars, Rigging, Sails, Etc.

1 Jib Topsail.
2 Club Topsail Sprit.
3 Topsail Club.
4 Club Topsail Guy.
5 Jib.
6 Club Topsail.
7 Mainsail.
8 Bowsprit.
9 Club Topsail Tack Line.
10 Mainsheet.
11 Foresail or Forestaysail Sheet.
12 Jib Topsail Sheet.
13 Topping Lift.
14 Gaff Topsail, Clewed Down.
15 Tack of Jib.
16 Tack of Jib Topsail.
17 Luff of Jib Topsail.
18 Head of Jib Topsail.
19 Jib Topsail Halyards
20 Leach of Jib Topsail.
21 Main Gaff.
22 Main Boom.
23 Main Topmast.
24 Foot of Jib.
25 Leach of Jib.
26 Clew of Jib.
27 Reef Points.
28 Tack of Mainsail.
29 Clew of Mainsail.
30 Peak of Mainsail.
31 Throat of Mainsail.
32 Main Crosstrees.
33 Masthead Runner and Tackle.
34 Head of Club Topsail.
35 Clew of Club Topsail.
36 Tack of Club Topsail.
37 Topmast Shrouds.

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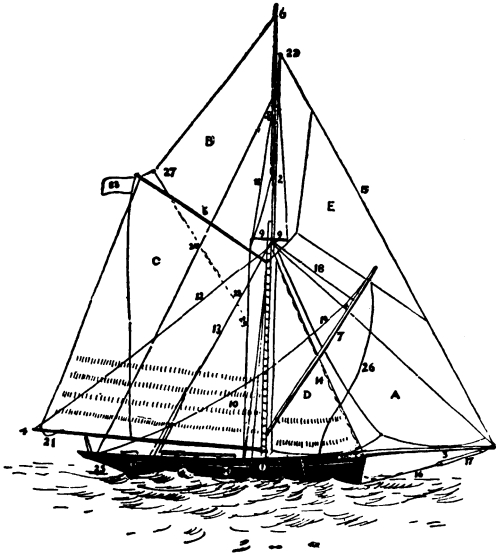

THE CUTTER YACHT.

Names of Spars, Sails, Standing and Running Rigging, Etc.

SPARS.

1 Lowermast.
2 Topmast.
3 Bowsprit.
4 Main Boom.
5 Gaff.
6 Topsail Sprit.
7 Spinnaker Boom.
8 Tiller.

RIGGING AND ROPES.

9 Crosstrees.
10 Shrouds.
11 Topmast Shrouds.
12 Topping Lift.
13 Masthead Runner and Tackle.
14 Forestay.
15 Topmast Stay.
16 Bobstay.
17 Bobstay Fall.
18 Spinnaker Boom Topping Lift.
19 Spinnaker Boom Brace.
20 Topmast Backstay.
21 Reef Pennant.
22 Truck.
23 Ensign.
24 Channels.
25 Mainsheet.
26 Spinnaker Boom Guy.
27 Clew of Sprit Topsail.
28 Tack of Sprit Topsail.
29 Tack Line or Pendant.
30 Sprit Topsail Halyards.

SAILS.

A Jib.
B Sprit Topsail.
C Mainsail.
D Foresail.
E Jib Topsail.

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ADDENDA.

RECENT CHANGES IN SAIL PLAN AND RIG OF MODERN CRAFT.

SINCE the first edition of this book was printed, yacht designers have studied to reduce weight aloft. This has not infrequently resulted in fitting ironwork, blocks, etc., far too flimsy to endure the strain of a stiff breeze. There is always a happy medium between spider-web rigging and rigging uselessly heavy and clumsy, and my advice therefore is not to go to extremes. In racing craft on the fresh-water lakes piano wire has been used for standing rigging, and because of its enormous strength and notable lightness has answered well enough. In salt water, however, it should be avoided because of its liability to corrosion.

The principal changes in rig of late years follow: The substitution of turnbuckles and rigging screws for the old-fashioned dead eyes and lanyards; the reduction of the length of the bowsprit because of the long overhang forward, which has done away with the reefing bowsprit on all modern craft; the invention of masthead shrouds, bridles on gaffs, and the throat halyard pennant. By means of the three devices mentioned, strains aloft are both minimized and equalized. Large vessels carry double masthead shrouds, and every racing yacht is fitted with single ones. Gaff bridles and throat halyard pennants are also considered to be well-nigh indispensable.

In the matter of running rigging, flexible steel wire is now much used for

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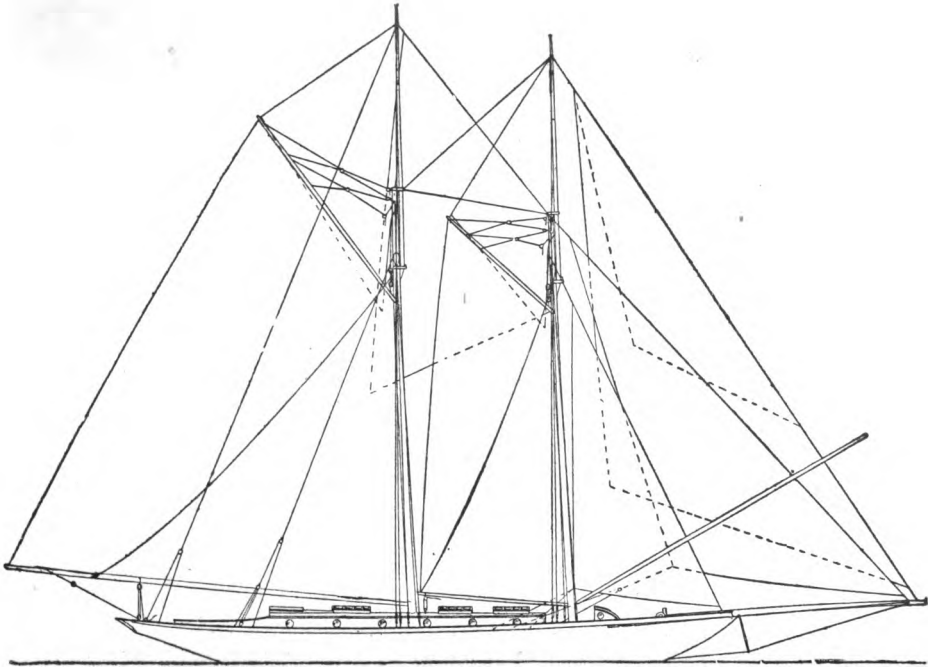

SAIL PLAN AND RIG OF A MODERN SCHOONER.

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RIG AND SAIL PLAN OF A MODERN YAWL.

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throat and peak halyards. Its advantage is that there is little or no "give" to it. The rig of a modern 25-foot water-line sloop with a pole mast is as follows: Bobstay-rod of steel ¾-inch in diameter, set up with a turnbuckle at the end of the bowsprit; shrouds, two each side, 1⅛-inch steel wire; forestay set up to stem head, 1¼-inch steel wire; jib set flying, hoisted with ¾-inch 8-stranded flexible steel-wire halyards, set up with a jig-purchase; runner-shrouds of ⅞-inch wire canvased over; main lifts ¾-inch flexible steel wire, parcelled, sured over with white codline and then covered with white canvas sewn on. The throat and peak halyards are of ¾-inch flexible steel wire. The blocks are all strapped with grommets of flexible steel wire sewed and leathered.

Steel wire is now also used for the leech ropes of racing sails, and is employed largely in the lower canvas of all the big racing yachts. Flexible steel wire is nearly as pliable as new hemp rope of the same strength. The greater the diameter of the sheaves over which it passes the longer it will last. This wire cannot be belayed to a cleat. Therefore, Manila rope is spliced to the hauling end of the wire, which insures its remaining fast after once being belayed. This is a most difficult splice to make

The accompanying illustrations show the sail plans and rigs of a modern schooner and a modern yawl. When compared with the sloop and cutter rigs on earlier pages, it will be easily seen that many radical changes have been made.

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It occurred to me in revising the book for this edition, that it might be wise to omit the directions for rigging a running bowsprit, bending a loose-footed mainsail, and some other devices which in the light of modern improvements might be deemed either archaic or obsolete. On second thoughts, however, I decided to let them stand as written. There is still a goodly fleet of "old-timers," cutters and yawls with straight stems and reefing bowsprits—craft some of them half a century old or more, and sound as a gold dollar in spite of severe service. The deadeye and the lanyard, although being pushed hard by the turnbuckle, die slowly, and are yet to be found in brand new vessels of the twentieth century.

To equalize and minimize strains on mainbooms, mainsheet bridles are now fitted. Overhangs are growing longer and longer and bowsprits shorter. A quite recent one-design class has a length on deck of 40 feet 7 inches, with a water-line length of 25 feet. The sail area is 1,103 feet, and the outside ballast weighs 6,100 pounds. The centerboard houses entirely below the cabin floor, the draught being 4 feet 6 inches, and 8 feet with the board down. The aim of the designer is to combine racing and cruising qualities—a much-to-be-desired combination, never to be completely attained, I fear.

THE END.

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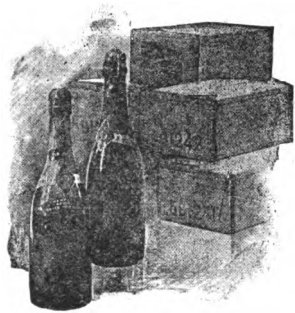

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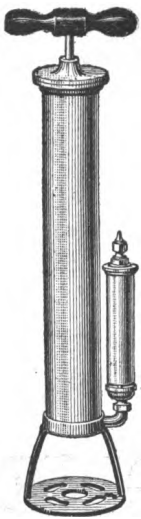

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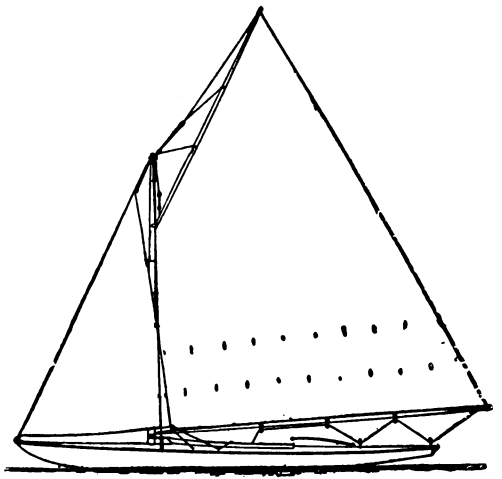

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